FARM ECONOMICS
Facts and Opinions

Cooperative Extension Service
University of Illinois
at Urbana-Champaign

DEPARTMENT OF AGRICULTURAL ECONOMICS
URBANA, ILLINOIS 61801

505-23

February 1988

88-1/Agricultural Credit Act of 1987: Implications for Illinois Farmers

On January 6, 1988, President Reagan signed into law H.R. 3030, a bill designed primarily to provide financial stability to the Farm Credit System (FCS) through the issuance of up to $4 billion of 15-year bonds backed by federal government guarantees. Known as the Agricultural Credit Act of 1987, the bill also calls for restructuring of the Farm Credit System, development of a secondary market for agricultural real estate and rural housing loans, improvements in FCS and Farmers Home Administration (FmHA) borrower rights, and an FmHA interest subsidy for guaranteed loans to new or restarting farmers for purchase of certain FCS-acquired property. Questions of interest to Illinois farmers follow:

Q. *Is borrower stock protected by the new legislation?*

A. Yes. Existing borrower stock is fully guaranteed. In addition, stock issued within 9 months after passage of the legislation or until the institution's stockholders agree to a new capitalization procedure will also be fully guaranteed.

Q. *With the Farm Credit System considering new capitalization procedures, is borrower stock a thing of the past?*

A. No. The legislation sets a minimum level of stock for any one borrower at the lesser of $1,000 or 2 percent of loan volume. However, stockholders of individual banks or associations may approve stock purchase requirements above this minimum level. The important point is that in the future, all borrower stock will be at risk.

Q. *Exactly how has the legislation provided assistance to the Farm Credit System?*

A. The legislation allows for the issuance of up to $4 billion of 15-year government bonds between now and September 30, 1992. Proceeds of these bond sales will be used to purchase preferred stock in FCS institutions needing outside help. This will create an infusion of equity capital for troubled banks and associations within the System. The Treasury will pay all interest on each bond during its first 5 years; interest payments will be split between the FCS and the Treasury for the next 5 years; and the FCS will pay all interest after year 10. All assistance from the federal government must be paid back when the Farm Credit Administration finds the system able to do so.

Q. *Will this assistance result in lower interest rates charged to Farm Credit System borrowers?*

A. Not necessarily. The legislation provides for financial assistance to the weaker financial institutions of the Farm Credit System. This will help ease some of the strain on the more financially sound institutions. While this may help maintain more competitive lending rates, one should not expect a significant reduction in interest rates simply as a result of this legislation.

Q. *Does the new legislation require restructuring of the Farm Credit System?*

A. Yes. Within 6 months of passage of the legislation, the Federal Intermediate Credit Bank (FICB) and the Federal Land Bank (FLB) in each of the existing 12 farm credit districts must be merged. Then, within 6 months of the merger of a district's FICB and FLB, each production credit association (PCA) and Federal Land Bank Association (FLBA) that serve approximately the same geographic area must take stockholder votes whether to merge those institutions. Stockholders of District Banks for Cooperatives will also vote whether to merge into a single National Bank for Cooperatives or remain separate. Within 18 months following the legislation, a systemwide proposal for merger of the 12 Farm Credit Banks into no fewer than 6 must be developed and presented to the bank stockholders for approval. A district that which votes against the merger proposal will be unable to seek help from other districts to repay any financial assistance it may receive. Mergers between individual districts could, of course, occur during the interim as necessary to address financial problems in certain banks.

Q. *Is the St. Louis district likely to merge with another district?*

A. At this point it is too early to predict whether or not a merger of the St. Louis district with another district will occur. In the past, the Louisville district has been identified as a likely partner for merger with St. Louis, but any such previous merger possibilities will be reconsidered in the context of the nationwide plan for reduction in the number of farm credit districts.

Q. *Will the St. Louis district require financial assistance from the federal government?*

A. Again, it is somewhat early to tell. However, current projections suggest that the St. Louis district can survive without financial assistance.

Q. *What is all this talk about a "secondary market?" What is a secondary market and how does it operate?*

A. A secondary market is a mechanism whereby lenders can, in essence, pool a number of farm mortgages and sell these mortgages to other investors in open financial markets. The new legislation allows the formation of a secondary market for farm mortgages and rural housing loans.

Q. *What are the implications for farmers of a secondary market?*

A. The implications are positive. In the past, many commercial banks and other financial institutions were often reluctant to make farm mortgage loans because of the long maturity of such loans. With a strong secondary market, these institutions could make such loans and then package them for sale in a secondary market. In the future, then, farmers may find more sources of farm mortgages and rural housing loans. It may also generate more opportunities for farmers to obtain long-term fixed-rate loans for the purchase of farmland.

Q. *If my farm mortgage is sold into a secondary market, must I now deal with an unknown investor rather than with the lender from whom I obtained the loan?*

A. No. The originating lender will continue to service the loan. The only difference is that by selling the mortgage into the secondary market the lender will get back the funds extended to you sooner so that they can be invested in other loans and shorter-term investments.

Q. *How will the development of a secondary market affect the Farm Credit System?*

A. There are limits to how fast a secondary market can develop. However, over time the existence of a secondary market will likely create greater competition for the system in long-term lending. The FCS will need to be competitive with other lenders in both costs and services to maintain their market share.

Q. *Will this new secondary market cost the taxpayers of this country?*

A. Possibly. The new legislation provides for a $1.5-billion line of credit from the U.S. Treasury to assure that the secondary market has the necessary funds needed to meet obligations on the securities issued. If this line of credit is used, there will be a direct cost to taxpayers. Also, some nondirect costs are associated with government guarantees of this nature.

Q. *What kind of provisions for "borrower rights" are contained in the new legislation?*

A. The provisions for borrower rights differ between FmHA and Farm Credit System borrowers and are in some instances quite technical. Here are some highlights:

- Eligible borrowers who lose their farms to FmHA may qualify to rent their home and up to 10 acres of adjoining land and buildings at a reasonable rent for up to 5 years.

- FmHA borrowers are given a period of 180 days following any FMHA acquisition of their farm in which they exclusively may repurchase the farm or lease it on terms established under FmHA regulations.

- Farm Credit System borrowers who lose their farms will have a new right of first refusal to repurchase or to lease the property.

- FmHA and Farm Credit System borrowers will both have increased access to information pertaining to their loans, including copies of appraisals made or used by the lender in considering the loans.

- Farm Credit banks and associations must, upon request of a borrower, review the loan to determine that the proper interest rate has been established under a differential rate plan. In addition, the bank or association must provide a written explanation of the basis for the rate charged and of how the credit status of the borrower might be improved to qualify for a lower rate.

Q. *What about loan restructuring?*

A. Farm Credit System institutions and FmHA are directed to restructure loans when the restructuring alternative is less costly to the lender. Denials for restructuring are subject to review.

Until now, FmHA loan treatment alternatives have not included write-downs of principal or interest. That is no longer the case. FmHA's priority will be to continue a lending relationship with principal and/or interest rate reduction when the government's net recovery will be equal or greater through such restructuring than through foreclosure.

As a condition of FmHA loan restructuring, borrowers may be required to enter into shared-appreciation arrangements that require the repayment of amounts written off or set aside.

Q. *What about loan restructuring by Farm Credit?*

A. Within the St. Louis Farm Credit District, a policy of "least-cost restructuring" (including interest and principal write-downs) has been in effect since mid-1986. Hence, the Farm Credit approach to restructuring in Illinois should not change substantially, although with increased oversight of restructuring decisions a somewhat more consistent and deliberate approach might be anticipated.

Q. *What kind of provisions in the new law relate to new or restarting farmers?*

A. The law rquires FmHA to establish a 3-year "demonstration program" to assist new or returning farmers in financing the purchase of farmland owned by Farm Credit institutions receiving assistance under the 1987 Act. Under the program, eligible farmers might qualify for interest rate reductions of up to 4 percent on guaranteed loans from Farm Credit System and other approved lenders. The term of the interest rate reduction could be for the outstanding term of the loan or 5 years, whichever is less.

Q. *Will farmer/stockholders have more or less control as a result of the new legislation?*

A. In general, the legislation gives stockholders more control. The main exception is that the FLBs and FICBs must merge regardless of stockholder opinion. In addition, as long as a bank or association is receiving financial assistance, that institution's operations and affairs will be largely directed by the new Assistance Board.

In most other respects, however, this legislation recognizes and enhances stockholder control: PCA and FLBA mergers can occur only with stockholder approval; consolidation of districts will occur only with stockholder approval; the law specifically permits stockholder reconsideration of association mergers that occurred after December 23, 1985; stockholders will vote on new capital plans for their association; and district banks may no longer dismiss directors or managers of associations.

In summary, farmers in Illinois should benefit from passage of the Agricultural Credit Act of 1987. Despite its financial problems, the Farm Credit System will continue as a viable lender to U.S. agriculture. Borrower rights have been strengthened, and stock in the Farm Credit System has been guaranteed against default. Authority for a government-backed secondary market in farm mortgages and rural housing loans will likely create additional opportunities for long-term financing.

David A. Lins Delmar Banner

Prepared by: David Lins, Extension Specialist, Farm Financial Management, and Delmar Banner, Extension Specialist, Agricultural Law

Submitted by: David A. Lins

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, IL 61801

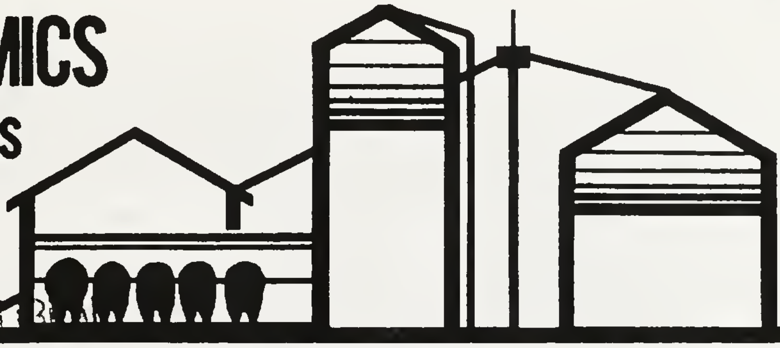
First Class

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

CES
Cooperative Extension Service
University of Illinois at Urbana-Champaign

FARM ECONOMICS
Facts and Opinions

DEPARTMENT OF AGRICULTURAL ECONOMICS
URBANA, ILLINOIS 61801



February 1988

88-2/Crop Production and Marketing Plans for 1988

Although you may have already made your 1988 crop plans, you might profit by taking a careful look at the Feed Grain and Wheat Programs for 1988 before carrying them out. Prices, costs, and provisions for participation might call for changes in your cropping program.

1988 PROGRAM PROVISIONS FOR FEED GRAINS & WHEAT

Target Prices and Loan Prices. For 1988 crops, the target prices will be $2.93 per bushel for corn and $4.23 for wheat. The announced loan rates will be $1.77 for corn and $2.21 for wheat. The base loan rate for soybeans continues at the $5.02 price level, but may be reduced by 5 percent to $4.77 if the Secretary of Agriculture deems it necessary.

Deficiency payment rates will be calculated as the difference between the target price of a commodity and either the average price farmers receive for the commodity during the 1988 grain marketing year or the announced loan rate, whichever is higher. This payment will apply to the effective yield production on program acres planted. An advance of 40 percent of the projected deficiency may be requested by the producer at the time he enrolls in the program. One half of this advance will be paid in cash at the time of sign up for program participation, and the other half in generic in-kind commodity certificates after May 15.

Diversion Payments. Participants in the 1988 feed grain program may receive payments for diverting 10 percent of their feed grain bases. The payment rate for this diversion option for feed grain producers is $1.75 per bushel for corn, $1.67 for sorghum, and $1.40 for barley. There is no paid land diversion for oats. Producers will receive all of the diversion payments in the form of generic certificates after May 15.

0-92 Provisions. Participating producers may submit applications to plant less than their permitted acreage of program crops and devote the unplanted land to conservation use (CU). This is known as the CU-for-pay option. Participants will receive deficiency payments equal to 92 percent of the assured projected payment rate for the program production on these acres. Not more than 50 percent of base acreage in any county may be retired in all land-idling programs. Application for 0-92 CU-for-pay participation must be made by March 11. Producers are

Table 1. Program Provisions and Payment Rates, 1988

	Corn	Sorghum	Barley	Oats	Wheat
Required acreage reduction (% of base)	20.0	20.0	20.0	5.0	27.5
Maximum permitted acreage (% of base)	80.0	80.0	80.0	95.0	72.5
Cash land diversion (% of base) . . .	10.0	10.0	10.0	NA	NA
Target price	$ 2.93	$ 2.78	$ 2.51	$ 1.55	$ 4.23
Adjusted 9-month loan price	1.77	1.68	1.44	0.90	2.21
Maximum deficiency payment rate. . . .	1.16	1.10	1.07	0.65	2.02
Deficiency subject to payment limitation	0.72	0.68	0.71	0.42	1.47
Projected deficiency payment rate . .	1.10	1.08	0.76	0.30	1.53
Advance deficiency rate	0.44	0.432	0.304	0.12	0.612
Land diversion payment rate	1.75	1.65	1.40	NA	NA

required to specify the number of acres intended for harvest and the number of acres to be devoted to conservation use.

Acreage and Yield Bases. The acreage base for determining acreage reduction and payments for 1988 feed grain and wheat crops for any given farmer is the farmer's yearly average number of acres planted or considered planted in the 5 years from 1983 to 1987. In the case of feed grains, corn and sorghum bases as well as barley and oats bases are combined for program benefits, as in previous years. The yield base is the same as for 1987 crops--that is, the yearly average effective program yield for the years 1981 through 1985, with the highest and lowest yields dropped.

Reduced and Diverted Set-Aside Acre Requirements. To qualify for target price deficiency payments, diversion payments, and commodity price support loans for corn and other feed grains, you must reduce acres planted for harvest by 20 percent. You may divert an additional 10 percent of the base and receive a land diversion payment based on per bushel program yields for these acres.

Wheat program participants must reduce acreage by 27.5 percent in order to be eligible for benefits. There is no paid land diversion for wheat in 1988.

The eligibility requirements for land to be set aside and the cover crops that meet program requirements are the same as those for programs prior to 1988. No harvesting of forage from conservation use acres set aside under 0-92 provisions will be permitted in 1988, as was the case in 1987 for 50-92. However, grazing of the set aside CU acres will be permitted before and after the April 1 through August 31 nongrazing period in Illinois.

Cross Compliance. Limited cross compliance is required for participation in the 1988 programs for feed grains and wheat. Limited compliance means that to qualify for program benefits of one commodity, the producer must restrict plantings of all other program crops to the base acres for those crops on that farm. Offsetting compliance between farms is not required.

Payment Limitation. Deficiency and diversion payments will be limited to a total of $50,000 per person for all participating program crops. The person receiving the payment must be actively engaged in farming. This limit does not apply to the portion of the deficiency payments that is made due to cuts in the announced loan rates below the basic loan rate of $2.21 for corn and $2.76 for wheat. Thus, only $0.72 of the deficiency payment for corn and $1.47 for wheat will be subject to the payment limitation. This is 3 and 6 cents less than the deficiency payment rates of $0.75 and $1.53 subject to limitation last year.

Penalty. Producers who sign up for participation and fail to comply with program requirements will be subject to a liquidated damages penalty. This penalty is program production multiplied by 20 percent of the commodity target price. In addition, advance payments must be repaid with interest.

Sign Up Dates. Wheat and feed grain program sign up will begin February 16 and continue through April 15. However, applications for participation in the 0-92 option must be made by March 11.

Comparing Crop Alternatives. To help you select crop combinations that will optimize net crop returns, the contributions of individual crops at varying yields and prices are presented in Table 2. An itemization of the costs of producing different crops is presented in Table 3. The "net return over variable cost" column in Table 2 indicates the marginal effects of acreage shifts on crop income. For instance, comparing (a) a net return of $93 over variable costs from a 130-bushel corn crop sold at harvest for $1.70 per bushel with (b) a net return of $187.75 for a 45-bushel soybean crop sold at harvest for $5.75 per bushel suggests that you might profitably shift some acres from corn to soybeans if you are not participating in the reduced acreage program for corn.

Similarly, in evaluating possible participation in 1988 program alternatives for corn, you should compare (a) expected net returns from crop production of one acre of corn if you don't participate with (b) net returns from having 0.8 acre devoted to corn production and 0.2 acre set aside. Then compare those returns with the return from using the optional 10 percent diversion alternative--that is, corn production on 0.7 acre, 0.2 acre set- aside, and 0.1 acre diverted. Finally, evaluate the 0-92 participation alternative, in which up to 100 percent of the base is put into soil- conserving crops.

The effect of participation in the 1988 feed grain and wheat programs on farm returns depends upon several factors. Major factors include (1) expected market prices, (2) expected yields, and (3) the extent to which expenditures can be reduced by idling acres. Other factors include the yield levels that form the basis for payments for idled acres, the value of advance payments in meeting cash flow needs, and the value of participation in the commodity loan program. In the case of wheat, another factor is the effect of participation on double crop returns.

At the harvest delivery prices currently being offered to producers ($1.70 for corn and $5.75 for soybeans), a composite 130-bushel yield corn base acre under participation in the feed grain program equals the return from an acre of 45-bushel soybeans. Similarly, the return from participation in a wheat program with a 54-bushel yield equals the return for a 30-bushel soybean crop. Double-cropping wheat land with soybeans reduces the advantage of participating in the wheat program.

If you expect yield levels near the program yield, you can anticipate a slight gain in net crop income by participating in the 20 percent set aside option instead of the 10 percent land diversion option. This is based on a comparison

Table 2. Comparison of Crop Returns per Acre, 1988

	Acres	Production or base (bu or ton)	Harvest price or rate per unit	Crop return or payment	Variable cost[1]	Net return over variable cost
CORN (No participation) . .	1.0	130	$ 1.70	$221.00	$128.00	$ 93.00
Participate--20% RAP						
Corn	0.8	104	1.70	176.80	102.40	
Req. set aside and deficiency for 0.8A . . .	0.2	100[2]	1.16	116.00	4.00	
Composite base acre . .	1.0			292.80	106.40	186.80
Participate--20% RAP + 10% Diverted Acres						
Corn	0.70	91.0	1.70	154.70	89.60	
Req. set aside and deficiency for 0.7A . . .	0.20	87.5[2]	1.16	101.50	4.00	
Paid diversion	0.10	12.5	1.75	21.88	2.00	
Composite base acre . .	1.00			278.08	95.60	182.48
Participate whole base--0-92 Option						
Corn	0.0					
Req. set aside	0.256	...	...	...	5.12	
Paid diversion	0.1	12.5	1.75	21.88	2.00	
Optional CU for pay . . .	0.644	80.5[2]	1.10	88.55	12.88	
Composite base acre . .	1.000			110.43	20.00	90.43
SOYBEANS	1.0	30	5.75	172.50	63.00	109.50
		45		258.75	71.00	187.75
		60		345.00	79.00	265.00
WHEAT (No participation) . .	1.0	54	2.70	145.80	63.00	82.80
Participate						
Wheat	0.725	39.2	2.70	105.84	45.70	
Req. set aside and deficiency for 0.725 A . .	0.275	36.3[2]	1.53	55.46	5.50	
Composite base acre . . .	1.000			161.30	51.20	110.10
Participate whole base--0-92 Option						
Wheat	0.0	...	...	...	...	
Req. set aside	0.333	...	...	...	6.66	
Optional CU for pay	0.667	33.35[2]	1.53	$ 51.03	13.34	
Composite base acre . . .	1.000			51.03	20.00	31.03
DOUBLE CROP SOYBEANS	1.0	20	5.75	115.00	59.00	56.00
WHEAT & DOUBLE CROP SOYBEANS (No participation)	1.0			260.80	122.00	138.80
Participate						
Composite base acre	1.0			244.70	94.00	150.70
OATS	1.0	60	1.40	84.00	49.00	35.00
	...	80	1.40	112.00	52.00	60.00
	...	100	1.40	140.00	57.00	83.00
HAY	1.0	3.0	50.00	150.00	85.00	65.00
	...	4.5	50.00	225.00	110.00	115.00
	...	6.0	50.00	300.00	135.00	165.00

[1] Includes seed, pesticides, fertilizer, machinery repairs and fuel, drying costs, and interest on operating capital only.
[2] Quantity for payment is program yield x acres planted or CU-for-pay. Assume ASCS program yield of 125 bushels for corn and 50 bushels for wheat.

Table 3. Estimated Costs Per Acre for Producing Crops, 1988

	Rotated corn (135 bu)	Second-year corn (125 bu)	Grain sorghum (120 bu)	Soybeans (45 bu)	Wheat (54 bu)	Oats (80 bu)	Double-crop soybeans (20 bu)	Set aside cover crop	Alfalfa hay (4.5 tons)
Variable costs:									
Seed	$ 18	$ 18	$ 6	$ 10	$ 10	$ 8	$ 11	$ 4	$ 10
Pesticides	14	28	13	18	1	1	25	...	7
Fertilizer									
N	24	24	20	...	14	12	...	...	...
P, K, Lime	24	22	20	18	16	12	6	4	49
Machinery, repair and fuel	26	26	23	22	18	16	14	7	40
Drying fuels & repair	16	15	18	...	...	...	...	...	...
Interest on operating capital	6	7	5	4	4	3	3	...	5
Total variable costs	128	140	105	71	63	52	59	15	111
Other costs:									
Machinery depreciation and interest	43	43	40	37	32	32	25	22	44
Labor	21	21	20	20	10	10	10	5	40
Management	12	11	8	11	6	4	5	...	14
Storing (int. & bin)	22	21	19	15	11	11	7	...	34
Misc	15	15	15	15	15	15	8	8	15
Total other costs	113	111	102	98	74	72	55	35	147
Land costs (cash rent)	80	80	80	80	80	80	...	80	80
Total all costs									
per acre	321	331	287	249	217	204	114	130	338
per unit	2.37	2.65	2.39	5.53	4.02	2.55	5.70	...	69.75

between (a) the net returns from 1 acre of paid land diversion (ASCS yield x $1.75, less conservation cover costs) with (b) net returns from one acre planted to corn (yield of corn x $2.93 less variable production costs). The critical considerations in any given case are the amount of variable costs and the production yield risk.

When yields are at normal levels, participation in the optional 0-92 land diversion results in lower net returns than any of the other alternatives for using the corn base acreage. However, owner-operators who have low yield expectations relative to yield payment levels and who can make substantial reductions in variable expenditures may profit from the 0-92 option.

Livestock producers considering participating in the program should compare (a) the quantity of feed grains that could be raised on the idled acres required for participation with (b) the amount of feed grains that could be purchased with the sum of the expected deficiency and diversion payments plus the crop costs saved by the idle acres.

All producers should carefully explore alternatives using worksheet AE-4543, Income Possibilities: Participation vs. Non-Participation in 1988 Government Program for Corn or Wheat. Copies of this worksheet are available in county Extension Offices.

R. A. Hinton

Prepared by: Dr. R. A. Hinton
Professor, Emeritus
Farm Management

R. P. Kesler

Issued by: R. P. Kesler
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

URBANA ILL. FEB 25 '88
US POSTAGE 0.22
PB METER 6121369

FIRST CLASS

Illinois Documents Section
State Library
Centennial Bldg.
Springfield, Il 62756

Cooperative Extension Service
University of Illinois at Urbana-Champaign

FARM ECONOMICS
Facts and Opinions

DEPARTMENT OF AGRICULTURAL ECONOMICS
URBANA, ILLINOIS 61801

March 1988

88-3/Preparation of Financial Information: Getting It Right[1]

Applicants for farm loans are often required to complete a balance sheet, income statement, and projected cash flow statement, along with some associated information. However, significant problems may exist in completing the forms and information in a consistent and accurate manner.

Borrowers may fail to understand the forms used by the lender. Lenders, by contrast, suggest that some borrowers intentionally distort their financial statements, hoping thereby to portray their farming operation in a better light. In an attempt to identify the extent of the problem and possible solutions, a survey of loan officers was conducted. Results of that work are reported here.

THE SURVEY

In late fall of 1987, Farmers Home Administration (FmHA) loan officers in Illinois were surveyed to obtain their opinions on the types of errors farm borrowers make in completing the Farm and Home Plan. A copy of the survey is available from the author. Over 100 FmHA loan officers responded to the survey. Although the survey was limited to FmHA loan officers, other lenders are likely to encounter similar problems.

FINANCIAL STATEMENTS (BALANCE SHEETS)

FmHA loan officers clearly indicated that borrowers make a significant number of serious errors in completing the balance sheet. Of the 11 different sections on the Farm and Home Plan, nearly one-third of the respondents said the balance sheet section has the most errors. And nearly 75 percent of the respondents indicated that this section is in the top three in terms of most commonly containing errors.

In light of these responses, it is quite evident that farm borrowers need to focus considerable attention on accurate completion of the balance sheet. Survey respondents were asked to identify the kinds of errors and mistakes that are most common on the balance sheet. Responses were split into problems on the asset and the liability sides of the balance sheet.

---

[1]Funds for this project were provided in part by the Illinois Farm Legal Assistance Foundation.

On the asset side of the balance sheet, nearly 90 percent of the respondents indicated that the most common error or mistake was to overvalue land or machinery. The valuation of capital assets is always difficult; however, farm borrowers may be able to avoid problems by documenting the values they place on capital assets. Appraisals of land and machinery would be useful but are often costly and time consuming. As an alternative, machinery values might be established by reference to the "National Farm Tractor and Implement Blue Book Valuation Guide." Real estate values may be estimated based upon comparable sales in the area. Alternatively, if historical values of real estate have been established accurately, annual changes may be obtained from estimates contained in "Farm Real Estate Market Developments," published by USDA. Other possible sources of information would be local realtors or auctioneers and perhaps the county assessor's office. The important point is to document the value which is used so that loan officers do not view the value as an arbitrary number chosen to "portray the farming operation in a favorable light."

Survey respondents also suggested that listing the growing crops at their eventual sale value is another fairly common error in completing the asset side of the balance sheet. The proper treatment of this item is to value the growing crops at the out-of-pocket costs that have been incurred to raise the crops to this point in time. This approach to valuation is conservative, particularly as the crop nears harvest, but this treatment is consistent with generally accepted accounting principles.

Another common problem on the asset side of the balance sheet is missing assets, that is, assets which exist but are not listed on the balance sheet. In most cases, these missing items appear to be honest omissions of items that the farmer may not remember when completing the balance sheet. A good example at present is the payments already earned but not yet received that are associated with participation in government programs. Intentional omission of assets should be avoided because discovery of such action will destroy the borrower-lender trust that must exist in a good lending relationship.

When asked to evaluate the overall degree of accuracy, survey respondents, on average, suggested that about 50 percent of their farm borrowers make serious or significant errors on the asset side of the balance sheet. Both borrowers and lenders need to take steps to improve this situation.

Survey respondents believed that, on average, nearly 55 percent of the current borrowers make significant or serious errors in completing the liability side of the balance sheet.

Two items were cited as the major source of concern on the liability side--missing liabilities (existing liabilities not listed) and incorrect dollar amounts for liabilities that are listed on the balance sheet.

Part of the problem with missing liabilities can likely be traced back to the forms used by lenders. For example, the Farm and Home Plan used by FmHA does not provide specific entries for such items as accounts payable for seed, fuel, and repairs. Likewise there is no specific blank line for including accrued interest on existing debts.

Several possible approaches could be taken to deal with this problem. First, lenders might be encouraged to develop and use more detailed financial statements, particularly on the liabilities side. An alternative would be for farmers to refer to other sources of information for the types of liabilities that need operating expenses. The most common problem cited by survey respondents was that projection estimates are not supported by historical records. Schedule F tax forms provide a fairly detailed breakdown of historical cash costs of production. From the borrower's perspective, when the projection estimate differs significantly from the historical value, an explanation of the difference should be provided. There may be very valid reasons why items change in value. For example, if a tractor was completely overhauled last year, then the projected repair expenses for this year may be substantially lower. However, because the loan officer may not be aware of the reason for the change, a note of explanation is in order.

The improper computing of interest expenses was identified as the second most common error in the estimating of operating expenses. Lenders can provide information on the amount of interest expenses likely to be incurred in the next year and should be consulted if problems of estimation exist. Historical records may not be very useful because of changes in dollar amounts of liabilities or because of changes in interest rates.

FAMILY LIVING EXPENSES

Survey respondents indicated, on average, that nearly 70 percent of current borrowers significantly understate family living expenses. The estimate of family living expenses was singled out by survey respondents as the one item most often misrepresented on the Farm and Home Plan. Part of the problem here likely stems from the fact that few farm families keep detailed records of family living expenses and are therefore not familiar with the amount of family living expenses commonly incurred by farm families.

Information from a sample of Farm Business Farm Management record keepers, however, can be used to suggest the likely range of family living expenses. Table 1 reports the amounts of family living expenses for farm families for the years 1983 to 1986. The average of family living expenses has increased each year and for 1986 was over $28,000. Families in the low third of the sample, however, averaged nearly $21,000 of family living expenses per year. Projection estimates that are below these averages would need to be documented carefully to avoid being questioned or considered inaccurate by the loan officer.

CAPITAL PURCHASES

Survey respondents indicated that approximately one-half of their borrowers make serious errors in estimating capital purchases. The failure to plan for adequate capital replacement was cited as the most common error. Several respondents also commented that the lack of plans to replace capital items (plus a projection estimate that includes no increase over time in repairs for existing equipment) results in unrealistic plans for many potential borrowers. Table 1 provides some evidence of the dollar amounts of capital replacements that are common in farming operations. If planned expenditures are below normal, repair expenses should likely be increasing.

NONFARM INCOME AND GOVERNMENT PAYMENTS

Nearly 55 percent of the Farm and Home Plans, according to survey respondents, have overly optimistic estimates of nonfarm income. Documentation of nonfarm income estimates would appear useful to borrowers wishing to provide plans that are acceptable to the lender.

to be included in a balance sheet. For example, the booklet "Coordinated Financial Statements for Agriculture" contains a fairly detailed list of the types of liabilities to include on the balance sheet.

Survey respondents suggested that another common error on the liability side of the balance sheet is to list an incorrect dollar amount of liabilities. Borrowers who are uncertain of the dollar amount of their liabilities with a particular lender should call their lender to determine the proper amount. Lenders should also be able to provide information on the amount of accrued interest on the loan, as well as principal amounts outstanding. In the case of existing borrowers, loan personnel might be able to help by providing the dollar amount of debt and accrued interest at the time financial forms are distributed to farm borrowers.

HISTORICAL AND PROJECTED CROP AND LIVESTOCK PRODUCTION AND SALES

The Farm and Home Plan asks borrowers to identify historical and projected estimates of livestock and crop production and sales. In general, the estimates contained in these sections of the Farm and Home Plan are comparable to the cash-receipts part of cash-flow projection forms used by other lenders. Survey respondents indicated that about 45 percent of the farm borrowers make serious or significant errors in completing cash-flow projection estimates.

Two areas of concern dominated the responses--overly optimistic yields or production and poor or inadequate historical records. Interestingly, most survey respondents did not identify the use of overly optimistic prices as a serious problem. Guidance from FmHA on prices to use is the likely reason for this outcome.

Given the concern about overly optimistic yields and production estimates, borrowers need to give careful consideration to documentation of yield and production estimates. Historical average yields can be helpful. However, a common issue here is how to handle drought or other weather-related occurrences that may have substantially affected past yields. Suppose, for example, that corn yields in 4 out of 5 years will average 110 bushels per acre. However, about once in every 5 years a drought lowers yields to 60 bushels per acre, lowering the 5-year average to 100 bushels per acre. In planning for the future, should you use an average of 110 bushels, which occurs in most years, or the 100 bushels to the acre, which is the long term average? A conservative approach followed by lenders would favor the use of the lower historical average, while the farm borrower may be more inclined to use the higher nondrought-year average. Recent regulations contained in the Farm Credit Act of 1987 require FmHA to use either on-site inspection or average yields for the county or state when "an accurate projection cannot be made because the applicant's past production history has been affected by natural disasters declared under the disaster Relief Act of 1974."

Another problem in completing cash-flow projections, as identified by survey participants, was poor or inadequate historical records upon which to base yield and production estimates. Ideally, the solution to this problem would be keeping more detailed records. Lacking such information, the farmer should be able to provide evidence of "proven yields" for commodities covered by government programs.

CASH FARM OPERATING EXPENSES

The Farm and Home Plan requires information on both historical and projected cash operating expenses for the loan applicant. Survey respondents indicated that about 45 percent of their farm borrowers make serious errors in estimating cash

Incorrect identification of the amount of government farm program payments was also identified as a problem. Because payments for commodity programs are spread over several years and because some payments are in the form of generic PIK (payment-in-kind) certificates, which often have a market value in excess of their face value, it may be useful for lenders to provide guidelines to borrowers on how to handle farm program payments.

IN SUMMARY

Survey evidence suggests that FmHA loan officers in Illinois believe that a high percentage (usually over 50 percent) of the financial statements prepared by farm borrowers have significant or serious errors. Other lenders are likely to have similar problems. The reasons behind this high proportion of statements with errors are varied. Some of the problems appear to relate to the nature of the forms used by lenders and to the lack of direction in filling out such forms. Many problems also relate to the lack of records and poor documentation by the borrower. A concerted effort by both farmers and lenders is needed to obtain better financial information.

Several strategies can be considered to improve the current situation. First, lenders can demand better plans before loan applications are accepted. That approach may be useful for new applicants but runs the danger of borrower animosity and additional confrontations under the general heading of "borrowers rights." This approach may be less applicable to existing borrowers. Existing borrowers already have outstanding loans and may object even more strenuously than new applicants to changes in standards being put in place after initial loan approval.

A more positive approach might be to offer incentives for borrowers who do an adequate job of completing the financial information required. Some lenders, for example, have offered lower interest rates to farmers who complete accurate financial statements. Available evidence seems to suggest that this approach can be successful, particularly when tied to educational programs that help borrowers complete the necessary forms. Through this process, both the farmer and lender can benefit from better information.

David A. Lins

Submitted by: David A. Lins
Extension Specialist
Farm Financial Management

Table 1. *Average Farm and Family Sources and Uses of Dollars and Living Expenditures by High and Low Noncapital Living Expenses, 1983 to 1986*

	All records, average per farm				Family of 3 to 5, 1986[a]	
	1986	1985	1984	1983	High-third	Low-third
Number in sample	324	313	286	257	72	72
Tillable acres farmed	651	629	602	601	757	561
Acres owned	124	119	112	128	148	120
Farm assets, January 1[b]	$350,114	$368,344	$411,320	...[c]	$423,649	$289,884
Farm assets, December 31[b]	335,180	374,126	402,024	...[c]	404,398	281,194
Liabilities, January 1	223,214	220,968	212,048	$227,749	254,452	188,877
Liabilities, December 31	212,064	234,155	219,049	223,757	245,303	178,476
Net farm income	25,555	25,677	13,573	...[c]	31,807	19,225
Source of dollars,						
Net nonfarm income	$ 8,526	$ 8,721	$ 9,208	$ 6,873	$ 8,222	$ 7,260
Money borrowed	123,445	137,065	96,895	81,460	141,111	112,822
Farm receipts	167,938	157,042	146,213	148,671	199,709	142,184
Uses of dollars,						
Interest paid	$ 20,421	$ 22,144	$ 20,651	$ 22,812	$ 23,530	$ 17,716
Cash operating expenses	100,983	96,761	90,621	84,680	119,383	89,515
Capital farm purchases	16,603	15,589	15,871	15,338	19,923	15,205
Payments on principal	134,604	123,430	90,191	85,006	148,988	123,651
Taxes, income and Social Security	3,762	4,358	4,823	4,255	4,948	2,083
Net new savings and investment	-5,206	13,320	3,446	-1,582	-5,571	-6,759
Living expenses,						
Contributions	$ 1,236	$ 1,145	$ 1,121	$ 1,154	$ 1,979	$ 774
Medical	3,226	3,146	3,126	2,774	3,673	2,575
Insurance, life and disability	2,139	2,209	2,197	2,104	3,052	1,159
Expendables	18,364	17,735	17,803	17,303	25,722	13,426
Total, noncapital expenses	(24,965)	(24,235)	(24,247)	(23,335)	(34,426)	(17,934)
Capital expenses	3,777	2,991	2,466	3,160	3,395	2,893
Total living expenses	$ 28,742	$ 27,226	$ 26,160	$ 26,495	$ 37,821	$ 20,827
Total noncapital living expenses, percent change	3.0	0.0	3.9	4.6		

NOTE: Data were summarized in the Department of Agricultural Economics, University of Illinois at Urbana-Champaign, from farm business records kept by cooperating farm families enrolled in Farm Business Farm Management associations in Illinois.

[a]Records were sorted into high- and low-third categories according to total noncapital living expenses.

[b]Modified cost basis except bare land values were held at current values between January 1 and December 31.

[c]Data not available.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

FARM ECONOMICS
Facts and Opinions

Cooperative Extension Service
University of Illinois at Urbana-Champaign

DEPARTMENT OF AGRICULTURAL ECONOMICS
URBANA, ILLINOIS 61801

March 1988

88-4/Recent Trends in Agriculture-Dependent Counties

These are not the best of times for rural areas in Illinois. Following the short-lived "rural renaissance" of the 1970s, rural areas are once again losing population. Many areas are also experiencing an erosion in services, the disappearance of jobs, and the closing of businesses. Although by earlier standards relatively few people are leaving farming, agricultural trends of the last several decades continue unabated. Farms are bigger with fewer farmers, and farm income has been depressed for several years, contributing to what has been termed a "farm financial crisis."

Trends in agriculture and conditions in rural areas have historically been linked. For many decades, agricultural conditions have been associated with a variety of rural demographic and economic conditions. The current farm financial crisis has again focused attention on the integration of agriculture with rural communities, the rural economy, and rural institutions. The depressed agricultural economy is said to be triggering a series of complex reactions affecting small towns and rural areas. This is a familiar theme in American agricultural history: the survival of fewer and larger farms, accompanied by an exodus of farmers and their families, leading to consolidation or disappearance of many rural institutions, a decline in agriculture-related economic activity, and the death or decline of businesses in many rural communities.

A major difference between the present situation and earlier trends is that the affected farming base is not as large as it once was and rural areas are not as symbiotically tied to agriculture as they once were. Rural areas have adapted and diversified, and agriculture is no longer the keystone of the economy in most rural areas. It is therefore difficult to predict the effect of the current farm crisis on rural areas. Its impact will undoubtedly depend on how closely the rural nonfarm economy is linked to agricultural production and income. Illinois has numerous small, heterogeneous rural communities. Some have undoubtedly been affected by recent agricultural trends, especially if they depend on agriculture for income, jobs, and retail sales.

GENERAL FARM TRENDS

There is considerable concern about the future viability of rural areas. This concern is reflected in a statewide rural task-force report examining rural needs and in recently developed Extension staffing recommendations for the next decade. The need to identify and understand the forces underlying the transformations taking place in rural areas is central to the expected rural development thrust of the next decade.

One of the basic transformations underway is the changing relationship between agriculture and rural areas. Both have been undergoing dramatic changes. Over the past three decades, farms have increased to about 350 acres. Between 1959 and 1982, Illinois lost about 56,000 farms, an average of more than 200 a month. At present, about 12 percent of Illinois farms are experiencing financial stress, that is, debt-to-asset ratios above 40 and negative cash income.

The Illinois trend in farm numbers and size reflects national trends of the last 50 years. Since 1930, about half the farms in the Midwest have disappeared, while the surviving farms have grown bigger. Thirty years ago, there were 6,000 farms with 500 acres or more in Illinois; now there are over three times as many. Although the number of small farms (under 100 acres) has decreased over the past two decades, they make up a higher proportion of all farms in the state. The operators of these small farms combine farming with nonfarm employment, making the continued availability of nonfarm jobs essential for retaining these people in agriculture. The creation of nonfarm employment also shifts the rural economy away from a dependence on agriculture.

GENERAL RURAL TRENDS

Rural Illinois has also changed in other ways over the past several decades. People continue to be attracted to selected areas of the state but not to others. Rural areas once considered unattractive as residences have experienced growth, either because people have changed their concept of residential desirability or because the areas themselves have changed. Data for the 1970s have shown, for example, that rural counties were growing at more than twice the rate of urbanized counties. This in-migration to rural counties was accompanied by a reduction in rural poverty and higher levels of family formation than in urban areas.

Demographic estimates in the mid-1980s are revealing a return to trends of the pre-1970 period, back to rural population decline and rural out-migration. Almost all rural areas of the state experienced net out-migration in the 1980s, with the result that there are fewer rural people now than there were 8 years ago. Rural areas still lag behind urban areas in other important ways as well.

FARMING-DEPENDENT AREAS

At one time, most Illinois counties depended heavily on agriculture for income and employment. The following data showing a 30-year trend for one county illustrate what has taken place across the state.

Macon County

	1950	1980
Number of farms	2,234	683
People living on farms	9,606	2,575
Farm workers	3,339	1,876
Total	12,976	4,451

Over 30 years, two-thirds of the jobs in farming were lost. What occurred in Macon County was repeated over and over across other counties in Illinois. Rural economies have diversified to the point that agriculture is no longer the main source of livelihood. Service industries, manufacturing, and construction now dominate economic activity in many rural areas much as they do in urban areas. As a result, rural areas rely much less on agricultural production and income as an economic base.

In many areas of the nation and state, however, the food and fiber sector is still an important source of employment. According to USDA statistics, it accounted for 21.5 percent of total employment nationwide in 1982, with Illinois slightly higher at 22.6 percent. This represents over one million workers in the state's food and fiber system, ranking Illinois fifth in the nation on this indicator.

Although rural areas have evolved away from agriculturally dependent economies toward economies based on manufacturing, government employment, recreation-tourism, and so on, about 30 percent of the 2,443 counties nationwide are still agriculture dependent. In Illinois there are 30 such counties; that is, they have derived 20 percent or more of total personal income from production agriculture. With few exceptions this set of counties cuts across the central part of the state.

EFFECT OF AGRICULTURAL DEPENDENCE ON RURAL AREAS

In this report we look at several demographic and economic trends in different types of rural counties, with particular emphasis on trends in those that are defined as agriculture dependent. For comparison we have included two other groups of counties: the "urbanized counties," which contain a city of at least 50,000 people, and "other rural counties," which depend much less on agriculture and do not contain a large city. By comparing the two groups of rural counties, we are able to make some inferences about the ways in which reliance on agriculture influences other countywide trends.

DEMOGRAPHIC TRENDS

Common perceptions that agriculturally oriented areas are not growing, that rural communities in them are stagnant, and that people are leaving all contribute to a bleak outlook for the future. To see how closely these perceptions match reality, we focused our attention on several demographic indicators for the three types of counties (Table 1). The agricultural counties are, first of all, fairly small, averaging about 18,000 residents. Altogether, they contain slightly over a half-million people, only about 5 percent of the state's population. In effect, trends in these counties are not likely to have much impact on overall state figures and trends.

Table 1. Demographic Trends in Different Types of Counties

Demographic indicators	Agricultural counties (N=51)	Other rural counties (N=21)	Urbanized counties (N=30)
Average size	18,067	33,138	464,400
Number of rural communities	248	215	410
	---------------	percentage	-------------
Rural community growth			
1970-1980	67.0	70.0	71.0
Population growth			
1970-1980	4.6	6.4	2.1
1980-1986	-3.5	-2.2	2.0
Net migration			
1970-1980	2.8	5.6	2.7
1980-1986	-4.6	-2.6	-3.0
Change in working-age population			
1970-1980	13.2	13.7	10.7
Elderly population (65+)	15.2	14.0	10.2
Change in elderly population			
1970-1980	11.6	14.2	16.1

How have rural communities fared in the agricultural counties? Evidence for the 1970-1980 decade, the last period for which there is community data, shows almost the same proportion of rural communities growing in agricultural counties as in the other types of counties (Table 1). More than two-thirds of all rural communities grew during the last decade, a period of unprecedented rural rebirth in the state and nation. Whether or not this will continue in the 1980s remains to be seen.

Agricultural counties also showed a modest population growth, 4.6 percent, during the 1970s. The highly urbanized counties, by contrast, had lower growth rates. Population trends for four periods, covering the years 1950 to 1986, are presented in Figure 1. For most of this period, population in agricultural counties has been decreasing; only in this decade have the other rural counties lost population. Urbanized counties have consistently grown, although at much lower levels during the last two periods than between 1950 and 1970.

As many have pointed out, the 1970s were an unusual decade in the state, and one that departed from past population trends. So far, the decade of the 1980s shows a sharp reversal and a return to the more common pattern for rural and urban areas of Illinois. Data for both migration and population growth in the first 6 years of this decade show that all three types of counties actually experienced net out-migration; that is, more people moved out of than into these counties. That is also true for the state, however, which had a net loss of over 300,000 persons to out-migration during this period. Still, data on both migration and population growth in the 1980s show that the agricultural counties did fare worse than the other rural counties, and neither did as well as the urbanized counties.

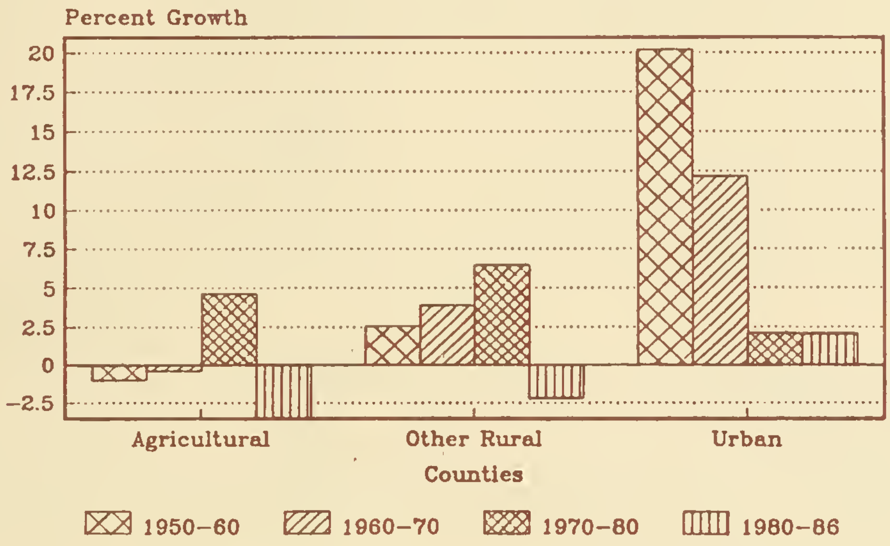


Figure 1. Percent change in population by type of county.

Finally, another indicator of population dynamics is the change in composition of the population. Table 1 contains two such measures: change in working-age population (those between 18 and 64) and change in elderly population (65 and over). The agricultural counties have more older persons, reflecting in part the past out-migration of younger persons and the tendency of older persons to remain in rural areas. During the 1970s, some elderly persons moved from cities back to rural areas upon retirement, but this accounted for only a small portion of the elderly population in agricultural counties. The growth in older population in agricultural counties, however, was about two-thirds the level experienced statewide (15.4 percent) during the 1970s. So although rural counties, and agricultural counties in particular, have higher percentages of older people in the population, that segment of the population is not growing as fast in these counties as it is in the highly urbanized counties. Another indicator reflecting this is the change in working-age population (18 to 64 years of age) during the 1970s. Both types of rural counties had larger increases in this category--again, we believe, a reflection of the in-migration and growth that occurred in rural areas during this decade. Comparable data for after 1980 is not available, and so we cannot determine if this trend has continued. On the basis of recent population decline and out-migration, an educated guess would be that it has not.

ECONOMIC TRENDS

A number of economic indicators show that rural areas have historically been considered disadvantaged when compared with urban areas. This is true of Illinois and of the nation. That disadvantage is confirmed by some of the trends in Table 2, but the table's primary focus is how agricultural counties differ from other rural counties. Much that has been written on the financial crisis in agriculture suggests that the economic viability of agricultural counties has been affected. We would thus expect that agricultural counties would be worse off, according to most economic trend data, than other rural counties are. Most of the indicators in Table 2, however, suggest they are not. Median household income in agricultural counties is very close to what it is in other rural areas, although in both of these groups it is considerably lower than in the urbanized counties. Similarly, change in income is almost identical in the two types of rural counties, and slightly higher than in the urbanized counties.

Table 2. Economic Trends in Different Types of Counties

Economic indicators	Agricultural Counties (N=30)	Other rural counties (N=51)	Urbanized counties (N=21)
Household income 1980	$18,452	$18,603	$23,503
	---------------percentage----------		
Income change 1970-1980	126.0	127.0	115.0
Population below poverty	10.2	10.4	10.7
Unemployment 1984	10.5	11.6	8.6
Change in retail establishments 1972-1977	-8.7	-7.4	-10.2
Change in nonfarm employment			
1980-1981	0	-.5	-.1
1983-1984	1.4	+.5	-.5

Levels of poverty are slightly lower in rural areas, reflecting in part the changing face of poverty in the state. Other reports have documented that, over time, poverty in the state has come to be identified with minority status and single-parent households, both predominantly urban county phenomena. Unemployment levels are higher in rural areas, but they are a little over 1 percent less in the agricultural counties than in the other rural counties. Retail establishments have declined across the state over the past few decades, so loss is not the issue as much as the magnitude of the loss. Data indicate that losses in rural areas have not been as sharp as in urban counties, although more retail establishments were lost in agricultural counties than in other rural counties. Finally, an all-important indicator, change in nonfarm employment, shows the agricultural counties doing better than either other rural counties or urban counties. For 1980-1981, a period of mild recession, none of the groups of counties increased nonfarm jobs. In the 1983-1984 period though, both types of rural counties did, and the growth in nonfarm jobs in agricultural counties exceeded that in the other types of counties.

SUMMARY

At one time most rural counties depended on agriculture for their viability. Farms and farm families kept businesses alive, created jobs, and provided students for schools and congregations for churches. Not so today, when farm people are a small minority in rural areas.

Not all rural areas have changed at the same rate or in the same ways. In some, what happens in agriculture is related to what happens in other areas of rural life--and agriculture is still a key element in the employment and income of many rural places. The 30 Illinois counties that have been identified as agriculture dependent presented a good opportunity to determine whether this dependence has affected demographic and economic trends. In general, we have tried to establish whether these counties suffered more than other rural counties that were tied more closely to other types of employment and income sources.The data to examine this issue in depth will not be available until the 1990 census, when the effects of the financial crisis in agriculture on rural areas will be more fully known. The data available, however, suggest that trends and conditions in agricultural counties are no worse than in other rural counties. If anything, the evidence shows that rural areas in general are different than urbanized areas. In particular, since 1980 the available evidence shows marked population loss and out-migration in all rural areas, regardless of their economic base. This loss will be instrumental in reversing many of the favorable trends that emerged in rural areas during the 1970s. The viability of rural areas depends on people living and buying in the areas, and that viability is being threatened.

Although the agricultural counties of Illinois do not stand out as being significantly different from other rural areas, one cannot generalize from this situation to the region or nation. Almost half of the agricultural counties in Illinois are adjacent to urbanized counties, which serve as sources of nonfarm jobs and as shopping areas. In addition, many of the agricultural counties have shown better-than-average nonfarm employment growth over the past several years. Farm people themselves have become a good source of labor for part-time and nonfarm jobs.

What is happening in rural areas at present may not be unrelated to farming conditions, but it is certainly less related than in the past. Improving rural conditions, therefore, will require solutions that go beyond helping agriculture. As K. Denvers, USDA economist, has stated, "You can't get at rural problems through agricultural policy anymore."

Richard P. Kesler

Issued by: Richard P. Kesler

Prepared by: Andrew J. Sofranko and Gary Morgan, Professor of Rural Sociology and graduate student in Rural Sociology, respectively.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Il 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-5 *March 1988*

Integrating Production and Resource Protection with a Conservation Plan

The Food Security Act of 1985[1] and Illinois's T-by-2000[2] guidelines provide strong incentives to integrate production and resource protection. The conservation compliance, sodbuster, and swampbuster provisions in the Food Security Act of 1985 tie most USDA farm program payments to soil conservation and resource protection for the first time. The state's T-by-2000 guidelines encourage the reduction of erosion to acceptable levels on all land by the year 2000. Furthermore, the state approved $20 million to assist producers in applying costly conservation structures.[3]

In this article and the next article, we discuss how these provisions and guidelines may affect your farm enterprise. The following example illustrates the main points of this legislation and the types of decisions you will face in the near future.

Sample Farm Enterprise

Jim and Jane Jones own 157 acres of farmland and rent another 500 acres. Recently they received a packet of materials from the local Soil Conservation Service (SCS) office that included a cover letter, a copy of the latest USDA form 1026 which they had signed during last year's farm program sign-up period, soils maps, and one or more Agricultural Stabilization and Conservation Service (ASCS) photos that show which fields they farm (rented and owned) are highly erodible.

The cover letter explained that highly erodible fields require special treatment under the Food Security Act. It also invited them to attend one of several conservation systems workshops[4] sponsored by the USDA agencies and the Soil and Water Conservation District in the next few months.

The letter briefly described that producers who attend the workshop will learn why their fields were classified as highly erodible, learn about the erosion process, determine if their present production and management practices reduce erosion to acceptable levels, identify alternative conservation systems that reduce erosion to acceptable levels, choose a preferred system for their farm, and write a conservation plan that at least meets the requirements of the Food Security Act and possibly the state's T-by-2000 guidelines. After completing the workshop, producers may submit their conservation plans to the Soil and Water Conservation District and the SCS for approval. The Jones family decides to attend the workshop.

The Conservation Systems Workshop

A conservation plan

The goal of the workshop is to assist producers in developing a conservation plan that meets the guidelines of the Food Security Act and T-by-2000. In the simplest terms, a conservation plan is a blueprint that producers follow in managing soil, water, and related plant and animal resources. A conservation plan helps land users put their resources to the best use, whether in farming, ranching, forestry, housing, recreation, transportation, or in a combination of uses.

Determining the need for a conservation plan

The development and application of a conservation plan is required for highly erodible fields that are covered by the Food Security Act's conservation compliance and sodbuster provisions. A conservation plan also helps producers to meet T-by-2000 guidelines, obtain state and federal cost-share funds, or enroll in the Conservation Reserve Program.

For the Food Security Act, SCS determines which land is highly erodible, using the water erodibility index:

Equation 1. Water Erodibility Index = (R x K x LS)/T

where

R = rainfall and runoff factor,

K = soil erodibility factor,

LS = slope length and steepness factor, and

T = soil's tolerance level factor

The R factor represents the erosive potential of rainfall and runoff patterns in a specific area. As R factors increase, the potential for erosion increases.

The K factor represents the inherent erodibility of a soil. The vulnerability of a soil depends upon its physical and chemical properties such as organic matter content, structure, permeability, and texture.

The LS factor represents the combined erosive potential of slope length and slope steepness. As slope length or steepness increases, erosion potential increases.

T is a soil's tolerance level. A soil loss tolerance level or T value is the average annual erosion rate that a soil can tolerate without damaging its inherent productivity.

For each soil map unit in every county, values for R, K, LS, and T are substituted into equation 1 and the equation is solved. If the computed index number for a particular soil equals or exceeds the number 8, that soil is classified as highly erodible.

If the highly erodible soils in a field equal or exceed 50 acres or one-third of the field's total acreage, SCS classifies the field as highly erodible.

Depending on the field's cropping history, it may be subject to either the conservation compliance provision or the sodbuster provision. The conservation compliance provision applies to highly erodible fields that were planted or considered planted in annual crops at least one year between 1981 and 1985. Any field that meets both conditions should be part of a conservation plan developed by the end of 1989 and applied by the end of 1994. As stated above, the incentive to meet these dates is continued eligibility to receive USDA farm program payments.

The sodbuster provision applies to highly erodible fields that were not planted or considered planted in annual crops during 1981 and 1985. Before a field can be brought into annual crop production, a conservation plan must be developed and completely applied on the sodbusted field. Otherwise, a producer may be ineligible to receive certain USDA program benefits.

For example, all five of the Jones family's fields were either planted in corn and soybeans or considered planted during the years 1981 through 1985 (Figure 1). Soil map units 250C2 (Velma silt loam, sloping and moderately eroded), 259C2 (Assumption silt loam, sloping and moderately eroded), and 259D2 (Assumption silt loam, strongly sloping and moderately eroded) have water erodibility index numbers greater than 8. Hence, they are highly erodible soils.

Since none of the fields exceeds 50 acres, we apply the one-third rule to the Jones farm. Fields 1 and 5 are not highly erodible because the highly erodible soil map units do not exceed one-third of the field. Field 2 is highly erodible because soil map units 259D2 and 250C2 comprise more than one-third of the field. Field 3 is highly erodible; 250C2 and 259C2 comprise more than one-third of the field. Field 4 is highly erodible also; soil map unit 259D2 constitutes more than one-third of the field.

Because fields 2, 3, and 4 are highly erodible and in annual crop production, they are subject to the conservation compliance provision of the Food Security Act. The Jones family needs a conservation plan on at least these three fields; otherwise, they will forfeit USDA farm program benefits beginning January 1, 1990.

Before moving to the next step, we should examine each field to see its status under T-by-2000. As of January 1, 1988, erosion on all land with slopes less than or equal to 5 percent should be at or below acceptable levels, as specified in the Illinois SCS *Field Office Technical Guide*. Erosion on slopes greater than 5 percent should be controlled to two times the soil's T value.

Although fields 1 and 5 are not highly erodible under the federal definition, erosion should be no higher than each soil's T value to meet the state's T-by-2000 guidelines.

As of this year, erosion in fields 2, 3, and 4 should be at or below two times the T value. Erosion of soils on slopes greater than 5 percent should be reduced to 1-1/2 T value by January 1, 1994, and to T values by January 1, 2000.

Completing the inventory of resource problems

After a brief review of the water erosion process, workshop participants assess the magnitude of their resource problems, particularly erosion. Two steps are typically undertaken to determine if actual erosion exceeds limits specified in the *Field Office Technical Guide* and T-by-2000 guidelines. First, average annual estimates of sheet and rill erosion are calculated. Second, other erosion problems such as ephemeral gully and gully erosion are identified.

Sheet and rill erosion. The Universal Soil Loss Equation (USLE) is used to estimate sheet and rill erosion:

Equation 2. $R \times K \times LS \times C \times P = A$

where

- R = rainfall and runoff factor,
- K = soil erodibility factor,
- LS = slope length and steepness factor,
- C = cropping-management factor,
- P = conservation practices factor, and
- A = average annual sheet and rill erosion.

The R, K, and LS factors are the same factors used in the water erodibility index. Producers have very little control over these factors.

The C factor adjusts potential erosion (R x K x LS) to account for the type of crops grown and their frequency in the crop rotation, the tillage system, and the amount of residue on the soil surface.

The P factor accounts for the erosion-reducing effects of conservation practices such as contour farming, contour stripcropping, and terraces.

Producers have considerable control over C and P. By choosing soil-conserving crops, tillage practices, and conservation practices, producers can reduce sheet and rill erosion to acceptable levels.

C- and P-value tables can be obtained from SCS and conservation district offices. Table 1 lists C values by crop, tillage method, and percentage of soil surface covered. The Extension publication "Estimating Your Soil Erosion Losses with the Universal Soil Loss Equation (USLE)"[5] lists C values by crop rotation. The publication also has P tables for producers interested in applying conservation practices.

To estimate average annual sheet and rill erosion in a field, we need values for the individual factors in the USLE. The SCS uses the R, K, and LS factors of each field's representative soil map unit, the most highly erodible soil map unit that comprises a significant part of the field.

The representative soil map units for the five fields and the R, K, and LS factors are shown in Table 2. Values for these factors can be found in each county's soil survey, or they can be obtained from the local SCS or conservation district office.

To select a C value, we need to know the rotation, tillage method, and percentage of soil surface covered with residue. The Joneses plant all their fields in corn and soybeans. For both crops, they chisel and broadcast fertilizer in the fall, disk twice in the spring to incorporate the herbicide application, plant, and row cultivate several weeks after planting.

The chisel-disk system buries and destroys about 80 percent of the corn residue and almost all of the more fragile soybean residue. Table 1 shows that the C value for wide-row soybeans after corn, chisel-disking, and 20 percent residue is 0.22. The C value for corn after soybeans, chisel-disking, and no residue is 0.40 (fall plowing leaves no soybean residue on the soil surface). Hence, the average C value for the rotation is 0.31, $(0.22 + 0.40)/2 = 0.31$.

The Jones family applies no conservation practices. The value for P is 1 when practices are not applied.

The USLE calculations and the acceptable erosion rates shown in Table 2 suggest that excessive sheet and rill erosion is occurring on fields 2, 3, and 4, designated as highly erodible land. These fields also exceed T-by-2000 guidelines.

Other erosion problems. Ephemeral gully and gully erosion also need to be controlled to acceptable levels. Ephemeral gullies are water channels that can be filled in by tillage operations. During the next heavy rainstorm, though, they reappear in the same locations, the dips and draws in a field.

Gullies that are not ephemeral cannot be obscured by tillage operations. They tend to be narrow and deep, with steep sidewalls. Gullies also have a pronounced head; water cascades off the gully head and undercuts it, advancing the gully up the hill.

To meet Food Security Act and T-by-2000 guidelines, ephemeral gully and gully erosion must be controlled to levels specified in the SCS *Field Office Technical Guide*. Generally, grassed waterways, terraces, diversions, water and sediment control basins, or grade stabilization structures will be needed to control ephemeral gully and gully erosion.

The Jones family has noticed the formation of an inverse Y-shaped ephemeral gully in field 4 over the past 10 years. They mark the area on their aerial photo, shown in Figure 1.

Summary

At the conservation systems workshop, the Jones family learned why fields 2, 3, and 4 were classified as highly erodible. An inventory of their erosion problems showed that their current corn-soybean rotation and chisel-disk tillage system does not reduce actual sheet and rill erosion to the levels specified in the SCS *Field Office Technical Guide*. Nor does their current management and production system prevent the formation of ephemeral gullies and gullies.

To meet Food Security Act and T-by-2000 guidelines, the Jones family must develop a conservation plan that reduces sheet and rill erosion to acceptable levels in fields 2, 3, 4, and 5 and stabilizes the ephemeral gully in field 4. A new combination of crop rotation, tillage method, and conservation practices can achieve the necessary reduction in erosion. In the next newsletter, we will examine the options available to the Joneses and the possible impact on their finances.

Prepared by:

Richard L. Farnsworth

Richard L. Farnsworth
Extension Specialist
Natural Resource Economics

Endnotes

1. House of Representatives. (1985). "The Food Security Act of 1985." The Committee of Conference, Report 99-447. Washington, DC: ASCS-USDA.

2. Illinois Department of Agriculture. (1985). "T by 2000: A state plan for meeting 'T' or tolerable soil losses in Illinois by the Year 2000." Springfield, Illinois: Illinois Department of Agriculture, Division of Natural Resources.

3. Illinois Department of Agriculture. (August, 1985). "Soil and water conservation district administrative guidelines for the Illinois conservation practices program (cpp) and the Illinois watershed land treatment program (wltp) for cost-sharing soil erosion control." Springfield, Illinois: Illinois Department of Agriculture, Division of Natural Resources.

4. Richard L. Farnsworth, Robert D. Walker, and Raymond J. Herman. "Conservation Systems Workshop." Manual M726. University of Illinois at Urbana-Champaign: Vocational Agricultural Services, 1988.

5. Robert D. Walker and Robert A. Pope. "Estimating Your Soil Erosion Losses with the Universal Soil Loss Equation." Circular 1220. University of Illinois at Urbana-Champaign: Illinois Cooperative Extension Service, 1983.

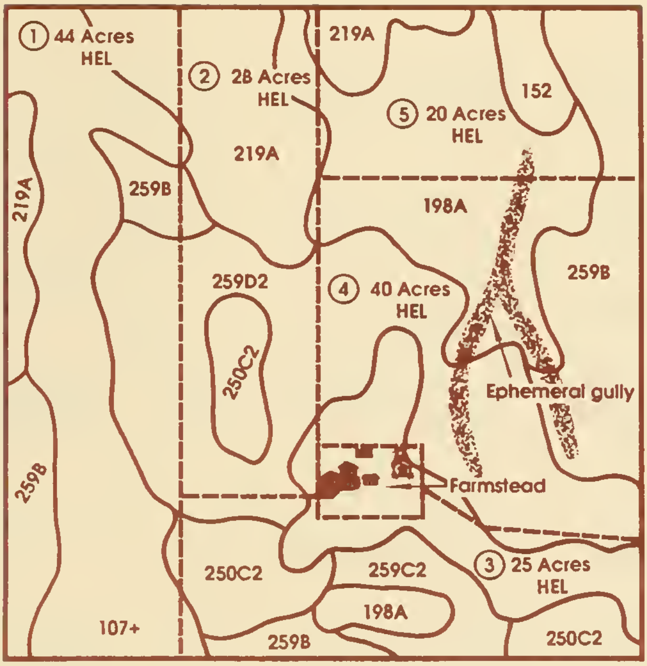


Figure 1. A soils map overlayed on this aerial photo of the Jones family farm delineates the soils in each of the five fields. The highly erodible land (HEL) designation indicates the field may need a conservation plan.

NOTE:

Number	*Name*	*Slope class*	*Erosion stage*
107+	Sawmill silt loam	Nearly level	Uneroded
152	Drummer silt loam	Nearly level	Uneroded
198A	Elburn silt loam	Nearly level	Uneroded
219A	Millbrook silt loam	Nearly level	Uneroded
250C2	Velma silt loam	Sloping	Moderately eroded
259B	Assumption silt loam	Gently sloping	Uneroded
259C2	Assumption silt loam	Sloping	Moderately eroded
259D2	Assumption silt loam	Strongly sloping	Moderately eroded

Table 1. Cropping-Management (C) Values for Use in the Universal Soil Loss Equation

Crop sequence		**Fall plow**	**Spring plow**	**Chisel - disk - ridge cover after plant**				**No-till cover after plant**			
				20%	*30%*	*40%*	*50%*	*60%*	*70%*	*80%*	*90%*
Corn after corn		.34	.29	.21	.18	.15	.12	.08	.06	.04	.03
Corn after small grain		.36	.30	.22	.20	.17	.15	.11	.08	.05	.03
Corn after meadow		.17	.13	.12	.11	.09	.07	.03	.02	.01	.01
Corn 2nd year after meadow		.30	.24	.19	.16	.13	.10	.06	.05	.04	.03
Soybeans after corn	Wide-row	.35	.30	.22	.19	.16	.14	.11	.08	.06	.04
	Drill	.27	.24	.19	.16	.13	.12	.10	.08	.06	.04
Soybeans after small grain	Wide-row	.37	.32	.24	.20	.17	.14	.12	.08	.06	.04
	Drill	.29	.24	.21	.17	.14	.12	.11	.08	.06	.04
Soybeans after meadow	Wide-row	.17	.13	.12	.08	.07	.06	.03	.02	.01	.01
	Drill	.14	.10	.09	.08	.06	.05	.03	.02	.01	.01
Soybeans after corn	Wide-row	.31	.25	.18	.15	.12	.11	.09	.07	.05	.03
(2nd year after meadow)	Drill	.25	.20	.16	.13	.11	.10	.09	.07	.05	.03
Small grain after corn (grain)		.10	.09	.08	.07	.06	.05	.06	.05	.04	.03
Small grain after corn (silage)		.14	...	.14	...	...	...	.12	...	...	...
									20%	*30%*	*40%*
Corn after soybeans		.40	.36	.34	.29	.24	...	.24	.19	.14	...
Soybeans after soybeans	Wide-row	.44	.39	.36	.32	...	...	.25	.20	.16	...
	Drill	.36	.32	.31	.29	...	...	.21	.18	.15	...
Small grain after soybeans		.11	.14	.09	.08	.07	.06	.07	.06	.05	...

NOTE: Adapted from *Illinois Field Office Technical Guide*, 1982.

Table 2. Erosion inventory for the Jones farm

Field	Acres	Representative soil map unit	R factor	K factor	LS factor	C factor	P factor	Estimated erosion RxKxLSxCxP (tons/acre)	T value	Ephemeral gullies or gullies	Achieve guidelines	
											FSA	T-by-2000
1	44	107+	180	0.28	0.13	0.31	1.0	2.0	5	No	NA	Yes
2	28	259D2	180	0.32	1.80	0.31	1.0	32.1	4	No	No	No
3	25	250C2	180	0.32	1.02	0.31	1.0	18.2	5	No	No	No
4	40	259D2	180	0.32	1.80	0.31	1.0	32.1	4	Yes	No	No
5	20	198A	180	0.32	0.27	0.31	1.0	4.8	5	No	NA	Yes

Cooperative Extension Service
United States Department of Agriculture
University of Illinois at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-6 *May 1988*

Integrating Production and Resource Protection with a Conservation Plan: Part 2

In the last newsletter, I reported on recent legislation that strongly encourages the development of conservation plans for highly erodible cropland fields. I also explained how producers could determine their need for a conservation plan by evaluating their resource problems.

In this newsletter, I discuss identifying conservation systems that reduce erosion to acceptable levels, selecting a particular system, and completing a conservation plan.

As I did before, I follow the format of the conservation systems workshops[1] being offered in your county and illustrate the main points by using the Jones family farm.

Identifying Acceptable Conservation Systems

New management, production, and conservation practices can control excessive erosion on highly erodible fields. Producers can apply the Universal Soil Loss Equation (USLE) described in the previous newsletter to build conservation systems. For other forms of erosion, private firms or public agencies can help to avoid improper use or misapplication of costly, enduring conservation practices and structures.

A different approach is to use guide sheets prepared by soil conservationists. These guide sheets show numerous mixes of crop rotations, tillage methods, and conservation practices. Generally, the options are divided into acceptable and unacceptable systems. An acceptable system reduces erosion to levels stated in the *Illinois Field Office Technical Guide*. The USLE is used to predict average annual sheet and rill erosion rates.

The Illinois Soil Conservation Service has prepared 10 Cropland Resource Management System guide sheets to assist producers in selecting acceptable systems for their highly erodible fields. Two guide sheets applicable to the soils found on the Jones family farm are shown in Figures 1 and 2.

The guide sheets cover a broad range of crops, tillage methods, and conservation practices, but they do not list all conceivable options. Producers who want more options should construct their own mix of land use, tillage, and conservation practices and apply the USLE to see if their system reduces sheet and rill erosion to acceptable levels. Furthermore, they must determine if the constructed system controls other forms of erosion. Public agencies and private groups can help them make these determinations.

Let's examine the Jones family farm. You will recall from the last newsletter that the Jones family farms 657 acres--157 acres of their own land and 500 acres of rented land. The conclusions reached in the last newsletter are summarized in Table 1. To maintain eligibility for USDA farm programs, the Jones family needs to develop and apply a conservation plan for fields 2, 3, 4, 7, and 8. To meet state T-by-2000 guidelines, erosion in all eight fields must be controlled before the year 2000.

The Jones family may use the guide sheets shown in Figures 1 and 2 to identify feasible conservation systems for their highly erodible fields. For soil map unit 250C2 (Velma silt loam, sloping, and moderately eroded), Figure 1 (soil resource management group 6) shows a number of combinations of crop rotations, tillage methods, and conservation practices that reduce sheet and rill erosion to acceptable levels. Similarly, Figure 2 (soil resource management group 8) lists the acceptable mixes of crop rotations, tillage methods, and conservation practices for soil map unit 259D2 (Assumption silt loam, strongly sloping, and moderately eroded). The shaded area represents unacceptable options.

In the lower part of each guide sheet, the Jones family may address other erosion problems such as the ephemeral gully in field 4. They may also address other resource problems such as water conservation, waste management, and fertilizer management.

The Jones family now realizes that they need to make substantial changes on their highly erodible fields. They will have to consider a change in tillage operations or crop rotation on fields 3 and 7. They will need to change crop rotations, switch tillage practices, add conservation practices such as contouring, or use a combination of these methods to control erosion on fields 2, 4, and 8. Before they choose a conservation system, they would like to examine its economic implications.

Selecting an Acceptable Conservation System

Congress has created a 10-year transition period for producers to meet government guidelines for erosion control on their highly erodible fields. Most producers will update their machinery and farming practices during this period anyway, so producers wishing to remain eligible for USDA farm program benefits can adopt the new soil-conserving management and production practices during the normal course of events.

Economics and experience will play important roles in the adoption of conservation systems on highly erodible fields. To assist producers in making decisions, some agencies, institutions, and private groups prepare crop production budgets. Two sample budgets handed out in the workshop attended by the Jones family are shown in Tables 2 and 3.

Generally, crop production budgets consist of three sections: receipts, costs, and net returns (receipts minus costs). These sample budgets will help the Jones family form their own revenue and expense projections.

Crop production budgets are particularly helpful in ranking conservation systems by level of net returns. Choosing or implementing a preferred system as part of a conservation plan may be considerably more difficult. Other factors--financial status, type and age of machinery and other equipment, management abilities, experience, industry support services, and marketing channels--can significantly affect a final decision or implementation schedule.

Several good private and public programs are available to help with financial problems. *Farm Business and Financial Management Transition Planning,* a microcomputer program developed by Richard Kesler and Bruce Burke[2], provides a 4-year financial projection and analysis of a farm business. The program's strength is its ability to assess the effects of capital purchases or other substantial changes on an operation.

The Transition program is available in most county Extension offices. Courses are offered throughout the year, or the program can be purchased through IlliNet, the Extension Office of Computer Coordination.

Let's apply the guide sheets and sample budgets to the Jones family farm. The Jones family decided to maintain a corn-soybean enterprise because they are very experienced in producing these crops. They also believe that market channels for oats and wheat are quickly disappearing in their part of the state.

Their decision to remain in corn and soybeans allows them to choose from several alternative tillage systems listed on the Cropland Resource Management Systems guide sheet (Figure 1) for fields 3 and 7. The Jones family prefers a no-till system because of labor and machinery savings.

The Jones family examines the mulch-till and no-till budgets for corn and soybeans shown in Tables 2 and 3. Mulch-till disturbs the total soil surface before planting, using chisels, field cultivators, disks, sweeps, or blades. For no-till, the soil surface is left undisturbed before planting, and planting is completed in a narrow seedbed 2 to 3 inches wide.[3]

Initially, the Jones family questions the assumption of equal yields for different tillage systems and low prices for corn and soybeans. After discussion with the workshop instructor and other producers at the workshop, they tentatively accept the budgets.

A large corn base allows the Jones family to select the no-till and mulch-till system for highly erodible fields 3 and 7. They also choose the corn-corn-soybean (CCS) rotation and a contour row direction for these fields and mark their choices on the guide sheet.

On highly erodible fields 2, 4, and 8, their choice is limited to no-till continuous corn on the contour. Terraces are not feasible because slope length is only about 100 feet. The Jones family circles the no-till tillage system, C for continuous corn, and a contour row direction on their guide sheets. Each year, they will inform the Soil Conservation Service (SCS) that most of the highly erodible land in fields 2, 4, and 8 will be set aside.

Completing a Conservation Plan

A conservation plan outlines the conservation systems that will be used to reduce erosion to acceptable levels and schedules the orderly implementation of the systems.

The Jones family has already completed part of the conservation plan by choosing the conservation systems for their highly erodible fields. The final step is to create an implementation schedule that will ease their transition into other production and management systems.

After carefully considering the type and age of their equipment, their current and future financial standing, their crop production budgets, and their limited experience with no-till and contouring, the Jones family feels they can schedule the implementation of the conservation systems circled in Figures 1 and 2. In the appropriate rows and columns, they write the dates for implementing each conservation system on each field, making sure the grassed waterway in field 4 is constructed after no-till is used in this field.

At this stage, the Joneses can present their guide sheets to SCS and their conservation district for review and approval. SCS will describe the requirements for residue cover and other requirements for each conservation system. They will also provide materials that will explain tillage methods, conservation practices, and construction and maintenance of enduring conservation structures.

The Jones family could fill out similar guide sheets for their other fields. If they submit their plan before 1990 and implement it before 1995, they will maintain their eligibility for USDA farm program benefits and meet the state's T-by-2000 guidelines as well.

Summary

I have used a rather simple farm example to illustrate conservation plan development. Integrating conservation and production will probably be harder for some producers. That's why it is important to begin thinking about your situation now. The conservation systems workshop is a good place to gather information and to talk with other producers who are experiencing similar problems.

Prepared by:

Richard L. Farnsworth
Extension Specialist
Natural Resource Economics

Issued by:

Richard L. Farnsworth

Richard L. Farnsworth

Endnotes

1. Farnsworth, R.L., R.D. Walker, and R.J. Herman. (1988). "Conservation systems workshop." Manual M726. University of Illinois at Urbana-Champaign: Vocational Agricultural Services.

2. Kesler, R.P., and B. Burke. (1985). "Farm business and financial management transition planning." IlliNet No. AGEC-P-114. University of Illinois at Urbana-Champaign: Cooperative Extension Service.

3. Conservation Tillage Information Center. (1986). "1986 national survey: Conservation tillage practices." Fort Wayne, IN: National Association of Conservation Districts.

USDA-SCS
IL CPA-16
12/87

CROPLAND RESOURCE MANAGEMENT SYSTEMS

Soil Resource Management Group 6

Cooperator Jones

Farm Number 1   Tract Number 1   Soil Mapping Unit 250C2

Date Planned ______

Field 3 Acres 25

Field 7 Acres 120

Field ______ Acres ______

LEGEND

CROP ROTATION

C - Corn
S - Soybeans
G - Small Grain (wheat or oats)
M - Meadow

TILLAGE SYSTEM

No - Till

No - Till (corn)
Mulch-Till (soybeans, small grain)

Mulch-Till

Spring Conventional Till

Fall Conventional Till

Ridge-Till

ROW DIRECTION

Not Contour

Contour

Contour Stripcrop

CROP ROTATION		TILLAGE SYSTEMS — DATE TO APPLY TILLAGE SYSTEM — MO/YR						DATE TO APPLY ROW DIRECTION
			4/92					
DATE TO APPLY ROTATION MO/YR	ROTATION	No-Till	No-Till Mulch-Till	Mulch-Till	Spring Conventional Tillage	Fall Conventional Tillage	Ridge-Till	MO/YR
		ROW DIRECTION						
	S							
	CS	contour					contour	
4/92	CCS	contour	contour				contour	4/92
	C	not contour	not contour				contour	
	CCSG	not contour	contour					
	CSG	not contour	contour					
	CSGM	not contour	not contour	contour	contour	contour stripcrop		
	CCSGMM	not contour	not contour	contour	contour	contour stripcrop		
	CSGMM	not contour	not contour	contour	contour	contour		
	CSGMMM	not contour	not contour	not contour	contour	contour		
	CSGMMMM	not contour	not contour	not contour	contour	contour		
	CGMM	not contour	not contour	not contour	not contour	contour		

DATE TO APPLY	ADDITIONAL RESOURCE MANAGEMENT PRACTICES
	GULLY EROSION CONTROL — Grassed Waterway — Grade Stabilization Structure
	Terraces — Water and Sediment Control Basin — Critical Area Planting
	EXCESS SURFACE OR SUBSURFACE WATER REMOVAL — Subsurface Drain
	Surface Drainage Field Ditch
	AGRICULTURAL WASTE MANAGEMENT — Waste Utilization
	WILDLIFE HABITAT MANAGEMENT — Field Border — Field Windbreak — Hedgerow Planting
	FERTILIZER AND PESTICIDE MANAGEMENT — Conservation Cropping Sequence

Figure 1. Acceptable conservation systems for fields 3 and 7.

USDA-SCS
IL-CPA-18
12/87

CROPLAND RESOURCE MANAGEMENT SYSTEMS

Soil Resource Management Group 8

Cooperator Jones Farm Number 1 Tract Number 1 Soil Mapping Unit 25902

Date Planned ______

Field 2 Acres 28

Field 4 Acres 40

Field 8 Acres 60

LEGEND

CROP ROTATION

C - Corn
S - Soybeans
G - Small Grain (wheat or oats)
M - Meadow

TILLAGE SYSTEM

No - Till

No - Till (corn)
Mulch-Till (soybeans, small grain)

Mulch-Till

Spring Conventional Till

Fall Conventional Till

Ridge-Till

Field 4

ROW DIRECTION

Not Contour

Contour

Contour Stripcrop

CROP ROTATION: DATE TO APPLY ROTATION MO/YR	CROP ROTATION: ROTATION	TILLAGE SYSTEMS (DATE TO APPLY TILLAGE SYSTEM — MO/YR): No-Till	No-Till Mulch-Till	Mulch-Till	Spring Conventional Tillage	Fall Conventional Tillage	Ridge-Till	DATE TO APPLY ROW DIRECTION MO/YR
		4/93						
		ROW DIRECTION						
	S							
	CS							
	CCS							
4/93	C	contour						4/93
	CCSG	contour						
	CSG	contour						
	CSGM	not contour	contour	contour stripcrop				
	CCSGMM	not contour	contour					
	CSGMM	not contour	contour	contour stripcrop	contour stripcrop	contour stripcrop		
	CSGMMM	not contour	contour	contour	contour stripcrop	contour stripcrop		
	CSGMMMM	not contour	contour	contour	contour stripcrop	contour stripcrop		
	CGMM	not contour	contour	contour	contour	contour stripcrop		

DATE TO APPLY	ADDITIONAL RESOURCE MANAGEMENT PRACTICES
4/94	GULLY EROSION CONTROL — Grassed Waterway — Grade Stabilization Structure
	Terraces — Water and Sediment Control Basin — Critical Area Planting
	EXCESS SURFACE OR SUBSURFACE WATER REMOVAL — Subsurface Drain
	Surface Drainage Field Ditch
	AGRICULTURAL WASTE MANAGEMENT — Waste Utilization
	WILDLIFE HABITAT MANAGEMENT — Field Border — Field Windbreak — Hedgerow Planting
	FERTILIZER AND PESTICIDE MANAGEMENT — Conservation Cropping Sequence

Figure 2. Acceptable conservation systems for fields 2, 4, and 8.

Table 1. Erosion Inventory and Soil Groups for the Jones Farm

Field	Acres	Highly erodible field	Representative soil map unit	Sheet and rill erosion problem	Ephemeral gullies or gullies	Soil resource management group
1	44	no	107+	no	no	1
2	28	yes	259D2	yes	no	8
3	25	yes	250C2	yes	no	6
4	40	yes	259D2	yes	yes	8
5	20	no	198A	no	no	1
6	320	no	219A	no	no	1
7	120	yes	250C2	yes	no	6
8	60	yes	259D2	yes	no	8

Table 2. Sample Budget for Producing Mulch-till Corn and No-till Corn (120 bu/A)

Operations and materials	Mulch-till	No-till	Producer estimate
Seed, fertilizer, and chemicals			
Seed, $67/80,000 kernel bag	$ 18.09[a]	$ 18.09[a]	
Nitrogen, $0.11/lb	15.84	15.84	
Phosphate, $0.11/lb	5.72	5.72	
Potash, $0.07/lb	2.38	2.38	
Lime, $12.00/ton	3.00	3.00	
Herbicide (pre)	4.50[b]	16.60[c]	
Herbicide (post)	5.70[d]	1.30[e]	
Insecticide	0.38[f]	0.90[g]	
Total materials cost	$ 55.61	$ 63.83	
Tillage, planting, and cultivation[h]			
Apply N, P, and K (custom)	$ 3.50	$ 3.50	
Apply herbicide (pre, custom)	3.50	3.50	
Apply herbicide and insecticide (post)	2.69	5.39	
Chisel	3.83		
Field cultivate	3.14		
Plant	7.94	7.94	
Row cultivate	5.33		
Total field operating cost	$ 29.93	$ 20.33	
Harvest[h]			
Combine and hauling	$ 31.72	$ 31.72	
Drying (50% of crop)	5.43	5.43	
Total harvest cost	$ 37.15	$ 37.15	
Cost subtotal	$122.69	$121.31	
Interest on operating capital, 7.25%	2.40	2.59	
Total production costs	$125.09	$123.90	
Ownership cost per bushel	$ 0.39	$ 0.23	
Variable cost per bushel	0.65	0.80	
Total production cost per bushel	$ 1.04	$ 1.03	

Table 2. Continued

Operations and materials	Mulch-till	No-till	Producer estimate
Total receipts ($2.00/bu)	$240.00	$240.00	
Total costs	125.09	123.90	
Returns to land, management, and risk	$114.91	$116.10	

NOTE: Adapted from Soil Conservation Service, 1987.
[a]Plant population is 21,500 kernels for 120 bushels.
[b]Based on 1.5 lb Bladex at $3.80/lb and 2.5 lb Atrazine at $1.80/lb.
[c]Based on 1.5 lb Bladex at $3.80/lb, 2.5 lb Atrazine at $1.80/lb, and 0.75 qt Paraquat at $34.10/gal.
[d]Based on 1.5 lb Bladex at $3.80/lb and 2 lb Atrazine at $1.80/lb.
[e]Based on 1.5 lb Bladex at $3.80/lb and 1 pt 2,4-D at $10.40/gal.
[f]Based on .25 lb Lorsban at $1.50/lb.
[g]Based on .75 lb Counter at $1.60/lb.
[h]All operations, except custom combining, include equipment ownership, operation, and repair costs.

Table 3. Sample Budget for Producing Mulch-till and No-till Soybeans (50 bu/A)

Operations and materials	Mulch-till	No-till	Producer estimate
Seed, fertilizer, and chemicals			
Seed	$ 13.19	$ 13.19	
Phosphate, $0.11/lb	4.62	4.62	
Potash, $0.07/lb	7.15	7.15	
Lime, $12.00/ton	3.00	3.00	
Herbicide (pre)	5.43[a]	21.53[b]	
Herbicide (post)	15.51[c]	6.86[d]	
Total materials cost	$ 48.90	$ 56.35	
Tillage, planting, and cultivation[e]			
Apply P and K (custom)	$ 3.50	$ 3.50	
Apply herbicide (pre, custom)	3.50	3.50	
Chisel	3.83		
Field cultivate	3.14		
Plant	7.94	7.94	
Apply herbicide (post)	2.69	2.69	
Row cultivate	5.33		
Total field operating cost	$ 29.93	$ 17.63	
Harvest[e]			
Combine and hauling	$ 24.70	$ 24.70	
Total harvest cost	$ 24.70	$ 24.70	
Cost subtotal	$103.53	$ 98.68	
Interest on operating capital, 7.25%	2.18	2.30	
Total production costs	$105.71	$100.98	

Table 3. Continued

Operations and materials	Mulch-till	No-till	Producer estimate
Ownership cost per bushel	$ 0.54	0.44	
Variable cost per bushel	1.58	1.58	
Total production cost per bushel	$ 2.12	$ 2.02	
Total receipts ($5.09/bu)	$254.50	$254.50	
Total costs	$105.71	$100.98	
Returns to land, management, and risk	$148.79	$153.52	

NOTE: Adapted from Soil Conservation Service, 1987.
[a]Based on 1.5 qt Treflan at $3.62/pt.
[b]Based on 2 qt Surflan at $13/qt and 1 qt Paraquat at $8.53/qt.
[c]Based on 1.5 pt Sencor at $10.34/pt.
[d]Based on 0.5 qt Basagran at $13.72/qt.
[e]All operations, except custom combining, include equipment ownership, operation, and repair costs.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-7 *May 1988*

Cost of Growing Corn and Soybeans in 1987

In 1987, the total of all costs per acre for growing corn in Illinois averaged $345 in the northern section, $351 in the central section with soil ratings from 86 to 100, $321 in the central section with soil ratings from 56 to 85, and $265 in the southern section. Soybean costs per acre were $277, $279, $246, and $210, respectively (see Table 1). Costs were lower in the southern section primarily because land costs are lower there. The total of all costs per bushel in the different sections of the state ranged from $1.91 to $2.54 for corn and from $5.83 to $6.00 for soybeans. Variations in this cost were related to weather factors, yields, and land quality.

These figures were obtained from Illinois farm business records kept by farmers enrolled in the Illinois Farm Business Farm Management Association. The samples included only farms with more than 260 acres of productive and nearly level soils in each area of the state; these are farms without livestock. Farms located in 22 counties north and northwest of the Illinois River are included in the sample for northern Illinois. Farms from 36 counties below a line from about Mattoon to Alton are in the sample for southern Illinois. The remaining 44 counties make up the sample for central Illinois. The sample farms averaged 632 tillable acres in northern Illinois, 662 acres in the central section with high soil ratings, 726 acres in the central section with low soil ratings, and 863 acres in southern Illinois.

This analysis includes some factors in the cost of doing business that nonagricultural businesses may not include. These factors are not used as expense items on income tax returns. Examples include a charge for labor performed by the farm operator, a rental charge for the use of owned and rented land, and an interest charge on equity in machinery and inventories of grain and livestock.

Nonland Costs

Soil fertility costs for soybeans were allocated on the basis of phosphorus, potassium, and lime removal, with the residual cost allocated to corn. The seed, crop, chemical, and drying expenses also included some commercial drying and storage and the estimated value of home-raised seed. The costs of fuel, machine hire, and machinery repair were reduced for income received from custom work. Labor costs included the cash value of hired labor, plus a charge for available unpaid labor at a rate of $1,225 per month. Building and storage costs were for repairs and depreciation only. The nonland interest rate in 1987 was set at 10 percent; this figure was then multiplied by half the average inventory value of crops at the beginning and end of the year, and the depreciated value of machinery and buildings, plus half the total operating expenses, were added to determine the total nonland interest charge. Overhead costs included insurance, utilities, the farm share of light vehicle expenses, and miscellaneous items. No charge has been made in this analysis for management, but it would normally be about 5 percent of the total cost per bushel, or 10 to 15 cents for corn and 25 to 30 cents per bushel for soybeans.

Land Costs

These costs included adjusted net rent and real estate taxes. Net rent was represented as the average rent received by crop-share landlords, reported on record-keeping farms for the period

1983 to 1986. Caution is needed in interpreting differences in land costs between areas. In the long run, the net-rent residual return to landowners should tend to equalize the total cost of production.

Costs per Bushel

Production costs per bushel of corn remained basically the same in 1987 as in 1986 for most areas of the state. The one exception is the southern Illinois area, where the cost to produce corn decreased by 17 cents per bushel because corn yields increased 10 bushels per acre and total production costs per acre decreased slightly. Corn yields in southern Illinois were 16 bushels per acre higher than the four-year average (1984-1987). Although total costs to produce corn in central and northern Illinois decreased by 3 to 5 percent, yields decreased 4 to 9 bushels per acre. This resulted in little change from 1986 in the cost to produce a bushel of corn. Overall, corn yields in northern and central Illinois were 2 to 4 bushels per acre below the average for the 1984 to 1987 period.

Production costs per bushel of soybeans in southern Illinois were higher in 1987 than in 1986. They were also higher in the central Illinois area for the group of farms with high soil ratings. Production costs decreased, however, on northern Illinois farms and on the group of farms in the central Illinois area with low soil ratings. Total of all costs decreased 1 to 4 percent from 1986, but soybean yields increased 2 bushels per acre on northern Illinois farms. Soybean yields decreased 1 to 5 bushels per acre on southern and central Illinois farms. Lower total costs and higher yields resulted in a 44-cent per bushel drop in the cost to produce soybeans on the northern Illinois farms. But lower yields on southern Illinois farms resulted in a 63-cent per bushel increase in production costs. Soybean yields in 1987 in central and southern Illinois were very close to the four-year average (1984-1987).

Total of all costs per acre to produce corn and soybeans has decreased 16 percent since 1981. However, out-of-pocket cash costs such as fertilizer, chemicals, and seed have not declined as much. Most of the decline in total costs has been caused by downsizing "crop production plants" on many farms. Lower land values resulting from lower incomes have decreased the adjusted net rent charged for land use. Machinery and equipment purchases have also declined, resulting in less investment and associated amounts of depreciation. These factors, along with lower interest rates, have lowered the nonland interest charge on capital invested in the business.

The average total 1987 cost of production still exceeds current corn-selling prices, although current soybean-selling prices are near or above production costs for 1987. An owner-operator with average yields during the past four years (1984-1987) would need 85 to 95 cents per bushel of corn and $1.62 to $2.06 per bushel of soybeans to recover the variable costs listed in Table 1. Recovering the total of all costs would require receiving $2.15 to $2.46 a bushel for corn and $5.83 to $6.30 a bushel for soybeans. Individual tenants and landowners computing the average break-even cost per bushel for growing corn and soybeans should divide the costs and yields shown in the table as they are shared by the terms of the lease.

Farmland values are related to grain prices and nonland costs of production because income left after other costs have been deducted is considered return to land. Average farmland values in Illinois have declined nearly 50 percent since 1979. Illinois grain-farm operator net income in 1987 averaged higher, primarily because price supports and crop deficiency payments from the government farm program have continued, corn yields in southern Illinois were higher, grain prices improved, and production costs were lower. This has resulted in more stabilized farmland values, and real returns to farmland have become more competitive with alternative investments. Whether this is a short-run occurrence or a long-term trend will depend on a number of factors operating in our economy, including future government farm programs.

Prepared by:

D.H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz
D.H. Lattz

Table 1. Costs Per Acre of Growing Corn and Soybeans on Illinois Grain Farms Without Livestock in 1987

	Corn				Soybeans			
	North	Central[1]	Central[2]	South	North	Central[1]	Central[2]	South
Number of farms	296	516	248	219	296	516	248	219
Acres in crop	280	249	273	281	214	294	310	331
Nonland costs								
Variable costs:								
Soil fertility	$ 45	$ 45	$ 49	$ 45	$ 15	$ 15	$ 16	$ 15
Pesticides	21	19	17	18	20	19	17	17
Seed	22	22	21	17	11	13	11	12
Drying and storage	14	18	16	5	5	4	4	2
Repairs, fuel, and hire	30	30	27	32	25	25	24	28
Total, variable costs	$132	$134	$130	$117	$ 76	$ 76	$ 72	$ 74
Percent change from 1986	-6	-5	-2	-1	-4	0	-3	1
Other nonland costs:								
Labor	$ 30	$ 32	$ 31	$ 30	$ 30	$ 29	$ 28	$ 28
Buildings and storage	15	8	10	9	10	5	5	4
Machinery depreciation	24	26	22	24	20	21	18	20
Nonland interest	29	27	23	15	26	24	19	14
Overhead	12	11	12	9	12	11	11	9
Total, other costs	$110	$104	$ 98	$ 87	$ 98	$ 90	$ 81	$ 75
Total, nonland costs	$242	$238	$228	$204	$174	$166	$153	$149
Percent change from 1986	-5	-5	-3	0	-3	-2	-4	-1
Land costs								
Taxes	$ 19	$ 21	$ 16	$ 9	$ 19	$ 21	$ 16	$ 9
Annually adjusted net rent	84	92	77	52	84	92	77	52
Total, land cost	$103	$113	$ 93	$ 61	$103	$113	$ 93	$ 61
Total, all costs	$345	$351	$321	$265	$277	$279	$246	$210
Percent change from 1986	-5	-5	-3	-1	-3	-3	-4	-1
1987 yields, bushels per acre	136	156	136	139	47	47	41	36
Nonland, cost per bushel	$1.78	$1.53	$1.68	$1.47	$3.70	$3.53	$3.73	$4.14
Total, all costs per bushel	$2.54	$2.25	$2.36	$1.91	$5.89	$5.94	$6.00	$5.83
1984-1987 average yield	140	158	139	123	44	47	42	36
Nonland cost per bushel	$1.73	$1.51	$1.64	$1.66	$3.95	$3.53	$3.64	$4.14
Total, all costs per bushel	$2.46	$2.22	$2.31	$2.15	$6.30	$5.94	$5.86	$5.83

[1] Soil productivity ratings of 86 to 100

Cooperative Extension Service
United States Department of Agriculture
University of Illinois at Urbana-Champaign
1301 W. Gregory Drive
Urbana, IL 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-8 *June 1988*

The Financial Position of Illinois Farm Operators: Costs and Returns from Crop and Livestock Enterprises

Improved Farm Earnings Result in Increase in Net Worth

Records kept by 3,373 farmers enrolled in the Illinois Farm Business Farm Management Association (FBFM) record-keeping program have been used to estimate changes in net worth from 1984 to 1987. On a cost basis, without considering inflation or deflation of capital asset values, the change was calculated by adding net farm and net nonfarm income and subtracting family living expenses and income and Social Security taxes (Table 1). Using this procedure, the net worth of the average Illinois farm operator declined by $10,551 in 1984; but it increased by $2,333 in 1985, by $848 in 1986, and by $15,253 in 1987.

The change in net worth on a balance sheet based on fair market value would be affected negatively if changes in land values during the period 1984 to 1987 were considered. Net worth changes would vary greatly among farms and areas in the state.

Net farm income is the accrued value of the operator's share of farm production less total operating expenses, including the amount of interest paid and depreciation plus gain or loss on machinery or buildings sold. When added to net nonfarm income, this is the income available to pay for family living expenses and income and Social Security taxes. This is also the source of income used to pay principal on long-term debt and to invest into savings. Estimates used in Table 1 for net nonfarm income and withdrawals for living expenses and taxes were based on a sample of 308 central Illinois farm families. These families identified all sources of farm and nonfarm funds and the uses of these funds for precise expenditures.

These expenditures were then adjusted downward by 10 percent to reflect the larger-than-average farms in central Illinois.

Capacity for Repayment of Capital Debt

The average amount available to each farm operator for repayment of capital debt was estimated at $13,851 in 1984, $26,136 in 1985, $22,149 in 1986, and $35,001 in 1987 (Table 1). These were the funds estimated to be available for capital purchases and payment of principal on long-term debt. The table shows actual dollar commitments per farm for capital purchases of machinery, equipment, or buildings. In 1984 these commitments were greater than funds available for capital debt repayment. Results from the last three years, however, indicate that the amount spent for capital purchases has been less than the funds available for capital debt repayment. From 1984 to 1987, capital purchases were lowest in 1985. Funds available for repayment of capital debt were highest in 1987.

The records show that funds available for repayment of debts varied less among areas in the state in 1987 than in previous years. Estimated changes in net worth in 1987 were positive in all areas of the state, with estimated increases ranging from $9,000 to $21,000.

Interest Paid as a Percent of Gross

In 1986, 92 percent of the FBFM farm operators had positive net farm incomes with cash interest payments less than 30 percent of their gross farm returns. The remaining 8 percent with interest payments exceeding 30 percent of their gross returns had negative net farm incomes; they could be expected to have problems with cash flow. In 1985, 14 percent of the FBFM farm operators had negative net farm incomes. Five percent of farm operators paid more than 35 percent of their gross for interest in 1986; they had negative net farm incomes, averaging $21,399 per farm. This group could be expected to have difficulty maintaining a farm business without off-farm income.

Fewer farms had negative farm incomes in 1987 than in 1986. Average operator interest paid in 1987 was $14,371, down $2,736 from 1986 and $4,492 lower than 1985. Lower interest rates, a reduction in the amount of money being borrowed, and extensive use of Commodity Credit Corporation (CCC) commodity loans account for the lower amounts of interest being paid. The average operator's net farm income increased in all areas of the state and on all types of farms. The largest increases in income were in the eastern and northeastern parts of the state and on beef farms.

Costs and Returns from Crops

Corn and soybean crops make important contributions to net farm incomes and the financial status of farm operators. Figures 1 and 2 show the cost and return per bushel of both corn and soybeans produced each year from 1977 to 1987 on 500 central Illinois grain farms with high-quality soils and no livestock. Note that the total cost of growing a bushel of corn exceeded the average annual Illinois corn price in six of the ten years since 1978. The difference between the total cost and the total nonland cost is the charge for the use of land. The deficits indicate that profits (returns for risk and management) had to come from equities in capital, primarily land, or from other unpaid inputs, such as operator labor or debt-free facilities. Although these deficits have continued, land values have stabilized, partly because the government farm program has provided income support.

Variable cost reflects the total of cash expenditures for fertilizer, pesticides, seed, and drying, which are normally shared according to the terms of the lease on rented farms, plus the cost of fuel, hire, and machinery repair. Other nonland costs include labor, depreciation, interest, building upkeep, and overhead.

Total costs per acre in 1987 decreased 5 percent from 1986. However, lower yields on these farms resulted in a slightly higher cost of production in 1987. Using the past four-year average corn yield of 158 bushels per acre, costs per bushel of corn produced are now averaging about $0.85 for the variable cost, $1.51 for the total nonland cost, and $2.22 for the total cost.

Figure 2 shows the cost and return per bushel of soybeans produced on these same farms from 1977 to 1987. Total cost has exceeded returns each year since 1980 with the exception of 1985, as the average annual price line shows. Prospects look better for 1988 because supplies are decreasing, resulting in higher soybean prices. With a normal yield of 47 bushels per acre, costs per bushel are now averaging about $1.62 for the variable cost, $3.53 for the total nonland cost, and $5.94 for the total cost. Total cost per bushel can be expected to go down as rent for the use of land goes down.

Costs and Returns from Livestock

Livestock has also been important to the current financial status of farm operators. The cost and returns per hundred pounds of pork produced annually from 1977 to 1987 on a sample of 87 farrow-to-finish enterprises with an average of 155 litters per year are shown in Figure 3. Continued high pork prices and low feed costs resulted in total returns exceeding total costs for the second year in a row. The last time the average hog producer experienced two profitable years back to back was in 1977 and 1978. These margins are expected to decline with higher feed costs and lower hog prices.

The average returns above the cost of feed and purchased animals from about 1,500 individual annual livestock enterprise records from 1983 to 1987 are shown in Table 2. This is the return available to pay for labor, machinery, equipment and building repairs, depreciation, livestock expenses, taxes, overhead, and the interest charge on all capital used. There is no profit until these costs are covered. The only enterprise in which returns have covered total costs in the last five years was the farrow-to-finish hog enterprise.

Based on the estimates of nonfeed costs in Table 2, the average returns above all costs from 1983 to

Table 1. Estimated Change in Net Worth and Capacity for Repayment of Capital Debt for 3,373 Illinois Farm Operators

	All Illinois counties			
	1984	1985	1986	1987
Net farm income	$ 8,624	$22,037	$21,575	$39,753
+ Net nonfarm income[a]	9,208	8,721	8,526	8,500
- Family living expenses[b]	24,042	24,503	25,868	26,000
- Income and Social Security taxes[b]	4,341	3,922	3,385	7,000
Change in net worth	$-10,551	$ 2,333	$ 848	$15,253
+ Depreciation.	24,402	23,803	21,301	19,748
Funds available for capital debt repayment	$ 13,851	$26,136	$22,149	$35,001
Capital purchases	$ 15,741	$13,875	$14,674	$14,637
Cash interest paid	$ 18,491	$18,863	$17,107	$14,371

[a]Actual amounts identified from a central Illinois sample of 308 farms for 1984, 1985, and 1986; amounts for 1987 are estimated.
[b]Actual amounts identified from a central Illinois sample of 308 farms for 1984, 1985, and 1986 reduced by 10 percent; amounts for 1987 are estimated.

Table 2. Returns above Cost of Feed and Purchased Animals to Livestock Enterprise Units from 1983 to 1987

Year	Farrow-to-finish hogs	Feeder-pig finishing	Feeder cattle	Dairy cattle	Beef herd[a]
	per hundredweight			*per cow*	
1983	$12.68	$ 5.26	$16.04	$ 885	$ 51
1984	16.72	10.98	20.39	995	21
1985	16.71	7.00	8.86	1,054	5
1986	26.50	16.06	17.93	1,062	85
1987	25.09	13.28	30.47	1,301	212
5-year average	$19.54	$10.52	$18.74	$1,059	$ 75
Nonfeed costs, 1983-1987					
Direct cash	$ 6.05[c]	$4.00[b]	$12.25[c]	$365[c]	$ 30[b]
Other cost	12.20[c]	6.75[b]	14.50[c]	740[c]	185[b]
Total	$18.25	$10.75	$26.75	$1,105	$215

[a]The feed cost for beef herds includes up to $60 of hay equivalent from salvage roughage.
[b]Includes veterinary costs, utilities, fuel, equipment and building repair costs, depreciation, labor, and other nonfeed costs, including interest on feeder livestock, from Table 6, *Farm Management Manual*, 1983 to 1987.
[c]Estimates of annual nonfeed costs are based on enterprise cost studies of operative units from 1983 to 1986.

1987 for hogs (farrow-to-finish) was $19.54 (returns above feed and purchased animals) minus $18.25 (nonfeed costs), or a positive $1.29 per hundred pounds produced. For feeder-pig finishing enterprises, returns were below all costs by an average of $0.23 per hundred pounds produced. Feeder cattle show returns per hundred pounds produced that are $8.01 short of covering all costs; dairy returns averaged $46.00 per cow below all costs, and beef cow herds are $140.00 short per cow.

Although returns to management were still negative for most livestock enterprises in 1987, livestock returns for beef and dairy enterprises improved significantly and returns to hog enterprises remained good. Feed costs remained relatively low, and beef and milk prices improved. Hog prices remained strong. Livestock producers who use their own capital without borrowed funds have large amounts of non-salable labor, feeds, or buildings; producers who are more efficient than the average farmer have been in the best position to take advantage of the lower feed costs.

This report, based on the summaries of Illinois farm business records, reviews the financial status of Illinois farm operators over the past four years. After adjusting for inflation, farm operator earnings in 1987 were the best since 1979. Above-average yields, improved grain and livestock prices, lower costs, and income support provided by the government farm program all contributed to better earnings. Sustaining this level of earnings will depend on a number of factors operating in our global economy, including the government's future farm programs.

Prepared by:

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Costs and Returns–Corn, Soybeans, and Pork

(Shade indicates a deficit below costs on all charts.)

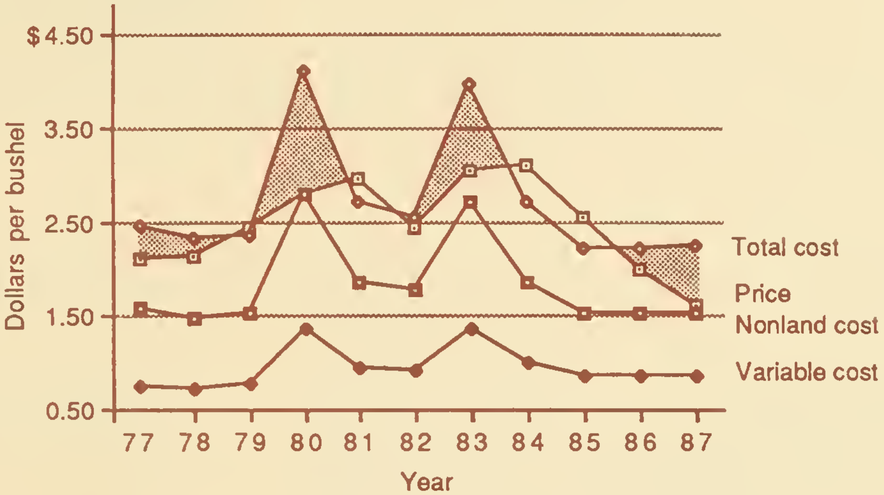


Figure 1. Costs and returns per bushel of corn produced on central Illinois grain farms from 1977 to 1987. Soil productivity rating, 86-100.

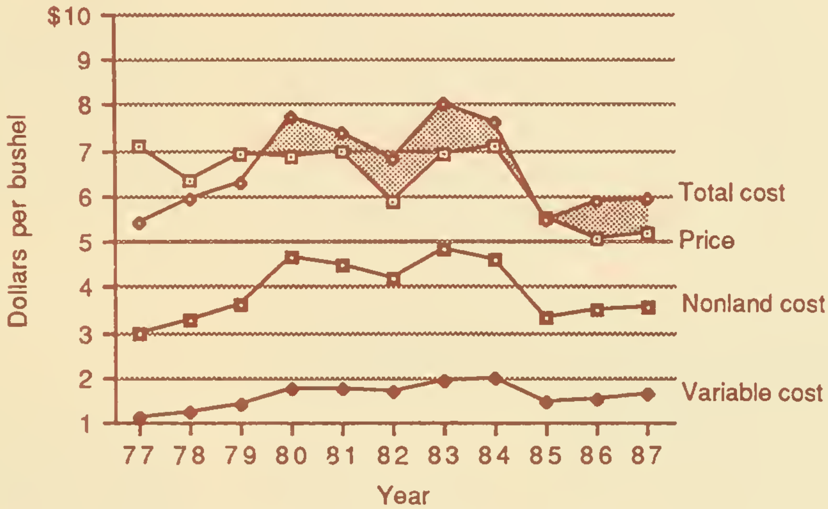


Figure 2. Costs and returns per bushel of soybeans produced on central Illinois grain farms from 1977 to 1987. Soil productivity rating, 86-100.

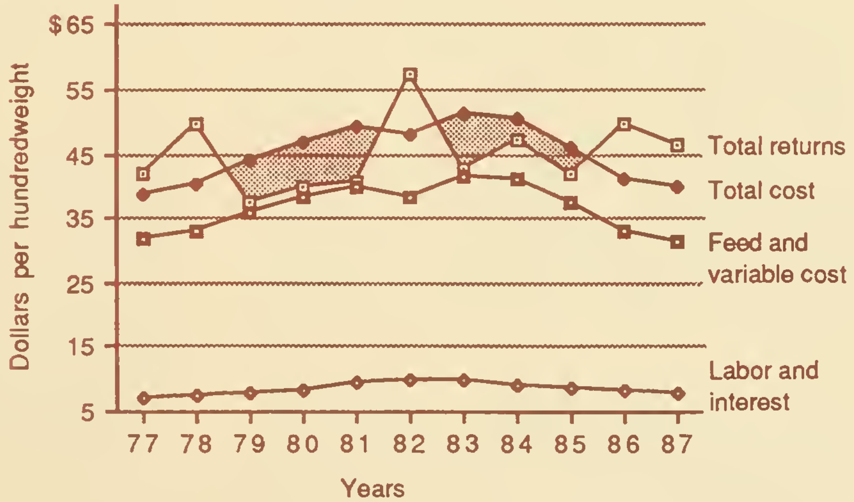


Figure 3. Costs and returns per hundred pounds of pork on farms with under 250 litters from 1977 to 1987.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-9 *June 1988*

Future Prospects in World Corn and Soybean Markets

Can Midwestern farmers expect any growth in export markets? After three years of decline, corn and soybean exports have showed modest gains in the last two years.

Growth in world demand for U.S. agricultural commodities will depend largely on: (1) the U.S. dollar exchange rate which determines the price other countries pay for our goods; (2) economic growth in underdeveloped countries which have the greatest demand potential; and (3) easing protectionist trade policies in the European Economic Community (EEC).

Causes of Export Decline in the 1980s

World trade in corn fell 14 percent from 1980 to 1985, while the U.S. share fell from over 70 percent to around 65 percent. World soybean trade stagnated in the early 1980s, and the U.S. share fell from 75 percent to 50 percent. These changes were caused by sluggish growth in world demand and higher prices in the United States.

Most of the increase in U.S. commodity prices was caused by the rising dollar, which increased 40 percent in value between 1980 and 1985. Overseas customers buy dollars with their own currencies and use those dollars to pay for U.S. goods. The exchange rate determines the price they pay in local currency. For example, the cost of soybeans for Germans--paying in German marks--increased between 1980 and 1985, even though the price in U.S. dollars fell (Table 1). As the prices of U.S. agricultural exports climbed, demand for U.S. products declined.

World demand grew slowly in the 1980s due to slow economic growth overseas and increased protection of overseas markets. Perhaps the most visible example of a market lost to protectionist policies is the EEC. When the EEC began to support prices well above world prices, Europeans increased production. Eventually, the EEC had a surplus and began to subsidize exports. In the 1970s, the EEC imported over 10 percent of world grain trade; they now export almost 10 percent of their grain. This shift from importer to exporter reduced demand for U.S. agricultural products and increased competition for the United States.

The greatest potential for demand is in underdeveloped countries, where demand for meat, and hence feedgrains, is still growing rapidly. Agricultural imports into these countries grew at an annual rate of 9 percent in the 1970s, but they stagnated in the early 1980s during the global economic recession.

Prospects for the 1990s

The dollar exchange rate peaked in March 1985, then fell more than 40 percent against European currencies and the Japanese yen. The dollar fell less dramatically against other currencies. For example, the dollar has fallen 9 percent against the South Korean won, the currency of one of our top ten agricultural customers. The dollar is likely to remain at low levels for some time.

Lower dollar exchange rates mean lower prices for overseas buyers. These lower prices have been very effective in stimulating demand in underdeveloped countries where there are fewer barriers to agricultural trade and greater potential for import growth. Although these countries are still suffering from the effects of recession in the early 1980s and the burden of large debt service at high interest rates, their economies have started to grow again. The USDA projects that these economies will grow at 3.0 to 3.5 percent in the coming year, in contrast to only 2.4 percent in the early 1980s.

The developing countries of East Asia and Latin America have shown the largest gains in agricultural imports from the United States during the last two years. Corn imports in East Asian countries (other than Japan) grew 39 percent in the 1986-1987 marketing year, and they are projected to grow another 19 percent this year. Corn imports into Mexico nearly doubled in the 1986-1987 marketing year and are projected to increase slightly this year. Soybean imports into East Asia and Latin America are showing steady, modest growth.

Lower prices for U.S. agricultural products have had little effect on import demand in the EEC because EEC policies limit imports. The EEC used to be the most important customer for U.S. corn and soybeans, but in recent years exports to the EEC have dwindled. In spite of lower prices, corn imports into the EEC dropped 30 percent in the 1986-1987 marketing year and are projected to remain at one-third the level of the early 1980s in the 1987-1988 marketing year. Corn prices within the EEC are set at a level roughly twice that of the world price, and the difference between the import price and the price within the EEC is collected as a tax. Corn buyers within the Community do not benefit from a fall in U.S. export prices, so they do not buy more U.S. corn. Soybeans are not subject to the same EEC policy, and soybean imports into the EEC increased in the 1986-1987 marketing year. Soybeans do compete with subsidized European production of rapeseed; and because rapeseed supply is growing, soybean exports to the EEC are projected to decline in the 1987-1988 marketing year.

The United States, the European Economic Community, and most other free-market economies are negotiating to reduce agricultural trade barriers. Agriculture is a priority in talks under the General Agreement on Trade and Tariffs (GATT). The United States has an ambitious plan to eliminate all agricultural subsidies and trade distortions before the year 2000. The EEC has a counterproposal to stabilize agricultural markets in the short run, based on existing market shares. Stabilization would benefit the EEC, which has increased its market share recently by subsidizing exports. The EEC also proposes to reduce subsidies in the long run but not to eliminate them.

U.S. policies that reduced world prices for many agricultural commodities in the last two years have put pressure on the EEC. The cost of subsidizing exports from the EEC has risen dramatically with the fall in the U.S. dollar exchange rate; this may have increased EEC willingness to negotiate. It is unlikely, however, that the EEC will ever open up its markets completely. They prefer to reduce surplus production through mandatory controls, which should reduce their competition with the United States through subsidized exports.

In summary, prospects for growth in U.S. agricultural exports are modest--but positive. The lower U.S. dollar exchange rate and renewed world economic growth have stimulated demand for corn and soybeans. The USDA projects an annual 3 to 4 percent growth in agricultural exports in the next decade. This is lower than the 10 percent annual growth of the 1970s, but it is better than the 6 percent annual decline of the early 1980s. Faster export growth will only come about if there are major reductions in trade barriers.

Table 1. Changes in Soybean Prices Paid by German Importers

	1980	1985	1987
U.S. dollars, FOB price[a] (dollars per bushel)	7.40	5.83	5.55
Exchange rate (German marks per U.S. dollars)	1.82	2.94	1.63
Price in German marks (marks per bushel)	13.47	17.14	9.05

[a]The price of soybeans loaded onto a ship for export at Gulf ports.

Prepared by:

Laurian J. Unnevehr
Extension Specialist
Agricultural Economics

Issued by:

Laurian J Unnevehr

Laurian J. Unnevehr

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-10 *July 1988*

Illinois Farm Property Tax Levels for 1987: More Evidence on the Farm Property Tax Paradox

Debate over the appropriate mix of state support and local property taxes for financing Illinois schools will probably continue. The weakened farm economy has resulted in a declining rural property tax base and its adequacy for the financing of schools is being critically challenged. The taxable value of farm real estate in downstate Illinois, after adjusting for inflation, declined 29.3 percent between 1982 and 1986 (payment years). The real taxable value of residential property in downstate counties declined 14.7 percent. Although the residential tax base in many counties is recovering with improved economic conditions, the devaluation that has taken place in the farm sector will probably not be recaptured soon.

The weakened farm economic conditions in the 1980s reversed the longstanding trend of ever-increasing property taxes on Illinois farmland. The trend began in 1984 and it continued through 1987, although there are signs that the decline in the average amount of taxes paid per acre is slowing. Average property taxes on Illinois grain farms declined 40 cents per acre in one year--from $14.71 per acre in 1986 to $14.31 per acre in 1987. Evidence of a slowing in this downward trend comes from the amount of taxes paid by the more productive northern and central Illinois grain farms. The average tax on these farms was $20.07 per acre in 1986 and $20.11 in 1987. These figures probably reflect higher tax rates, particularly voter-approved school rate increases, which more than offset lower assessments. The average tax rate on farm property increased 18.5 percent between 1980 and 1985 (the most recent year for which complete data are available). The large number of successful rural school referenda in 1987 and 1988 will continue to press the rate side of the property tax equation upward.

Per acre property taxes for a sample of Illinois grain farms from 1976 to 1987 are shown in Figure 1a. Data for the sample farms in the 68 northern and central Illinois counties and the 34 southern Illinois counties are also included in Figures 1b and 1c. In 1987, the sample included 1,959 grain farms, totaling 1.5 million acres of land. Higher building assessments on livestock farms will result in higher per acre taxes than those shown in Figures 1a, 1b, and 1c.

The gap between per acre taxes in southern Illinois and those in northern and central Illinois appears to be widening. The traditional pattern has been for per acre taxes in southern Illinois to be somewhat less than half per acre taxes in the rest of the state. This percentage has been declining and in 1987 was 44 percent. A major reason for this change is that taxes have declined more in recent years in southern Illinois (7.9 percent in southern Illinois versus 1.6 percent in the rest of the state in 1987)--a result of lower assessments on lower quality soils (more prevalent in the south) and less upward pressure on tax rates (average tax rates on farmland in southern counties are less than in northern and central Illinois counties). The 1987 per acre property taxes on northern and central Illinois grain farms averaged $18.19, compared to an average of $8.04 in southern Illinois.

Lower assessments on Illinois farms will cause property tax revenues to decline unless tax rates are adjusted. There is significant pressure for higher tax rates--particularly from rural schools--to maintain needed local tax revenues, offset weakened tax bases, and provide the desired level of school spending. This pressure will continue unless a significant reorganization in Illinois school financing occurs and the state government assumes a larger role.

Effective Tax Rates and More Evidence on the Farm Property Tax Paradox

The effective property tax rate, which compares property taxes to land values, is one way to measure the property tax burden on Illinois farms. Rates for the last 12 years are shown in Table 1. Between 1981 and 1987, effective rates for Illinois farms increased 114.3 percent (from 0.56 percent to 1.20 percent). This increase reflects slightly lower property taxes and a substantial reduction in Illinois farmland values. The recent strengthening of farmland values should slow growth in the effective tax rate in 1988. However, the effective tax rate for Illinois farms will probably be under continued upward pressure as the fiscal stress on rural schools and rural governments intensifies and local governments and school districts struggle to finance demanded services through higher tax rates.

Unless schools are financed differently, rural property taxes are targeted for reform, or farmland markets are significantly strengthened, the trend toward higher property tax burdens, as measured by the effective tax rate, will continue.

The farm property tax paradox in Illinois continues as property tax burdens increase and per acre property taxes decline (Figure 2). Until 1981, the property tax burden was declining. From 1975 to 1981, per acre property taxes increased, but at a slower rate than the market value of Illinois farmland. This resulted in a drop in the effective property tax rate.

The farm property tax paradox became apparent in 1983. The weak farm economy resulted in lower assessments, and rural governments did not compensate for this with higher tax rates. The result was that average per acre taxes were lower. However, the significant decline in the market value of Illinois farmland drove the effective tax rate up, reversing the trend of declining effective tax rates. The farm property tax paradox--lower per acre farm property taxes and a higher property tax burden on agriculture--continues in 1987. Resolution of the paradox could come from the farm economy (through higher market values for farmland), local taxing bodies (through reduced spending on schools and other services, which would lower tax rates), state policymakers (mainly through reduced reliance on property taxes to finance local services, particularly schools), or a combination thereof. Some help may come from a strengthened economy, but the paradox will be resolved fundamentally through changes in state school tax and spending policies. So far, state tax public policy has ignored the paradox and the imbalance that it may be causing.

Property Taxes, Balance, and Illinois Agriculture

The farm property tax paradox illustrates the lower taxing capacity in rural Illinois as rural counties emerge from the economic turbulence of the early 1980s. For tax systems to be supported, they must be perceived as equitable and fair. The property tax continues to be criticized for its excess burden on the elderly and on agriculture. Although they seem unrelated, the two groups have a common base: relatively high real property ownership (and property taxes) compared to current income. Most states, including Illinois, address the fairness of property taxes for the elderly through circuit breakers, in which state grants reimburse older citizens for property taxes paid in excess of a certain percentage of income.

Tax collection per $1,000 of personal income is a frequent measure of tax comparison. Traditionally used in cross-state comparisons of tax climates, the application of this measure across economic sectors in Illinois provides insight into within-state equity issues. Personal income data from the Regional Economic Information System of the U.S. Department of Commerce and property tax extension data from the Illinois Department of Revenue were used to compute property taxes per $1,000 of personal income for all economic sectors in Illinois and specifically for the Illinois farm sector. Because farm income varies significantly from year to year, averages were calculated for 5-year periods beginning with 1980 through 1984; these figures are presented in Table 2.

In Illinois, an average of approximately $36 in property taxes per $1,000 in personal income was collected in each of the 5-year periods. Personal income in Illinois grew from slightly over $124 billion in 1980 to $180 billion in 1986 (an average annual increase of 6.4 percent). Property tax extensions during this period increased from $4.32 billion to $6.28 billion.

In the Illinois farm sector, taxpayers contributed $404.13 in property taxes per $1,000 personal income from 1980 to 1984. This average declined to $347.50 for 1981 to 1985 because 1984 income was up significantly over 1980 income. The figure increased to $373.57 in the most recent 5-year period (income and property taxes were both down but income decreased more, increasing the average). The variation from one 5-year period to another is more a reflection of variation in farm income than changes in farm property taxes.

Since most farm property taxes (about 75 cents out of every dollar) support rural schools, the high ratio of farm taxes to personal income is determined principally by the method used to finance Illinois schools. For this reason, addressing the imbalance between farm property taxes and farm personal income will require difficult public finance and tax policy decisions. Some of the revenues from farm property taxes now going to schools will have to be replaced with revenues from other taxes (for example, the state income tax); this will benefit some taxpayers at the expense of others. Policies that redistribute tax burdens to improve equity and the perception of fairness require high levels of political leadership and statesmanship.

Summary

The farm property tax paradox continues in Illinois, as lower assessments put downward pressure on per acre taxes while effective property tax rates (that is, property tax burdens) for farms increase. The importance of farmland in agricultural production is one reason that farm property taxes per $1,000 of farm personal income are nearly 10 times higher than property taxes per $1,000 of personal income for the state as a whole. Dealing with this paradox or improving the balance between property taxes and income in the farm sector will require fundamental changes in the state and local public finance systems in Illinois. State government will have to assume a larger role in financing elementary and secondary education, and the unique characteristics of rural Illinois will have to be accommodated in public finance and tax policy.

Prepared by:

David L. Chicoine
Extension Economist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

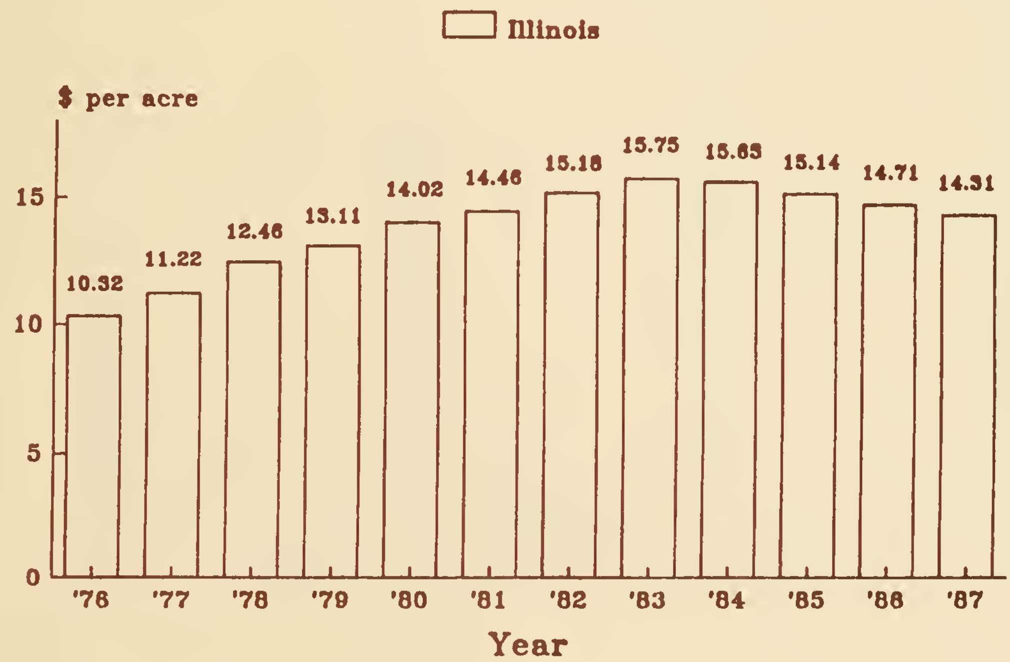


Figure 1a. Per acre property taxes on Illinois grain farms, 1976 to 1987.

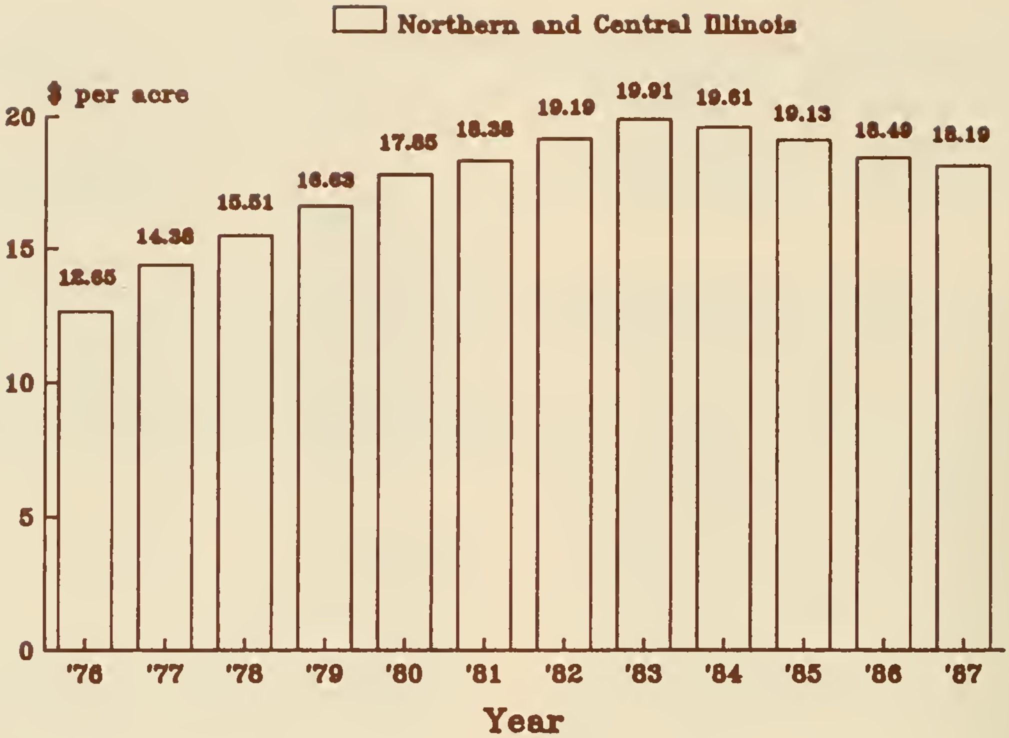


Figure 1b. Per acre property taxes on northern and central Illinois grain farms, 1976 to 1987.

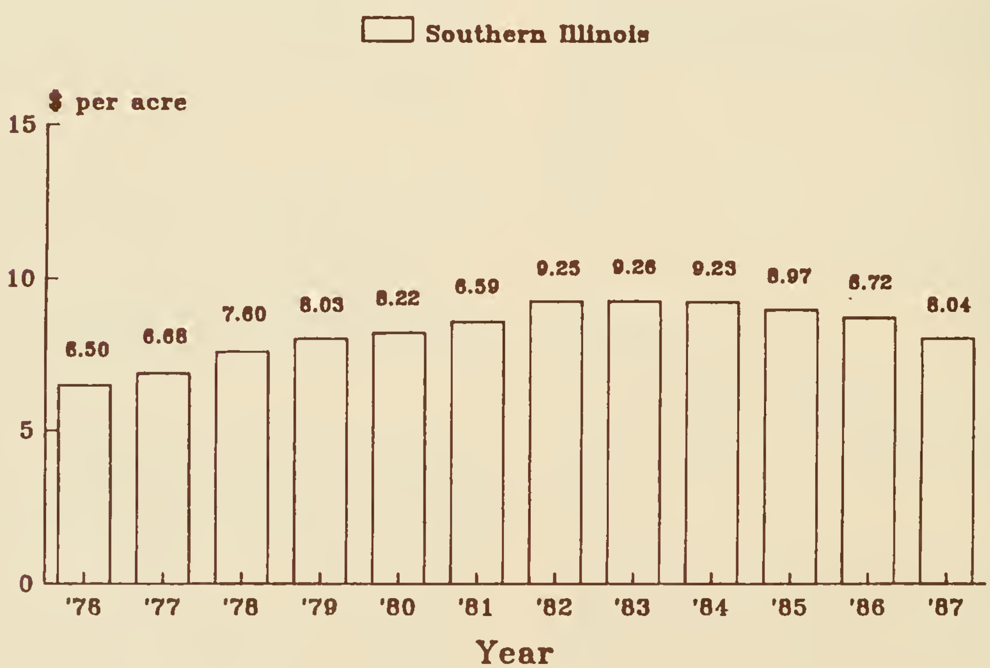


Figure 1c. Per acre property taxes on southern Illinois grain farms, 1976 to 1987.

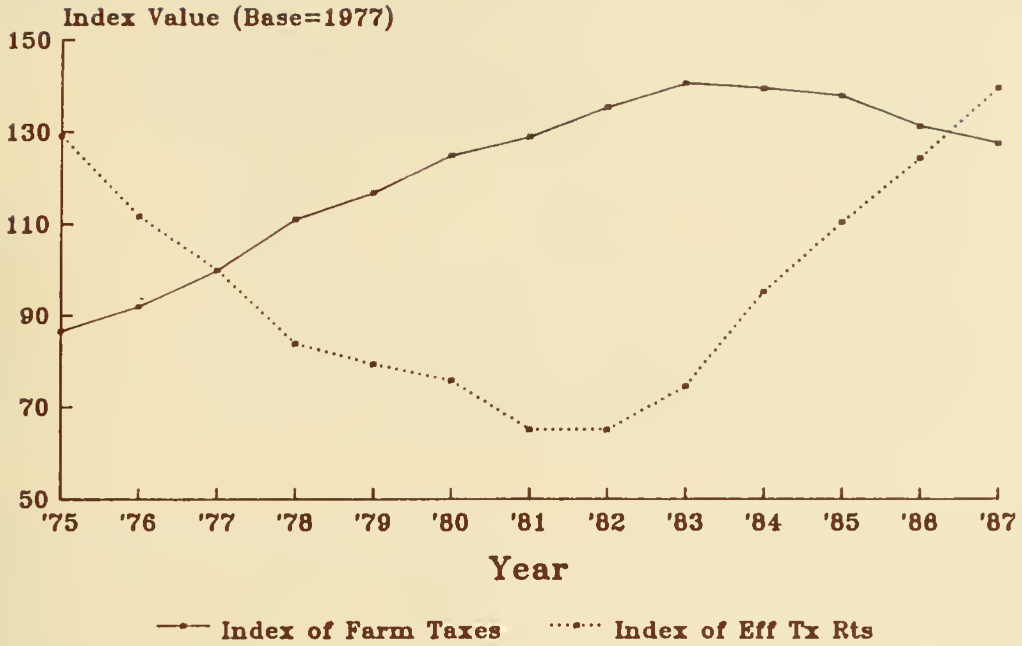


Figure 2. Index of per acre farm property taxes and effective farm property tax rates, 1975 to 1987--the farm property tax paradox.

Table 1. Effective Property Tax Rates on Illinois Farms, 1976 to 1987

Tax year	Effective tax rate, percent[a] Northern Illinois	Southern Illinois	Illinois
1976	1.02	0.88	0.96
1977	0.93	0.75	0.86
1978	0.74	0.62	0.72
1979	0.72	0.59	0.68
1980	0.69	0.54	0.65
1981	0.60	0.49	0.56
1982	0.58	0.51	0.56
1983	0.66	0.56	0.64
1984	0.85	0.72	0.82
1985	0.99	0.84	0.95
1986	1.11	0.94	1.07
1987	1.31	0.92	1.20

[a]The effective tax rate figures property taxes as a percentage of the market value of farmland. Only grain farms were used in making this computation.

Table 2. Illinois Property Tax Receipts per $1,000 Personal Income

Selected 5-year periods	Moving averages	
	All sectors	Farm sector
1980-1984	$36.31	$404.13
1981-1985	$36.38	$347.50
1982-1986	$36.26	$373.59

SOURCES: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce; *Illinois Property Tax Statistics*, Department of Revenue, Springfield, Illinois.
NOTE: Property taxes are for payment year.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-11 *July 1988*

Ten-Percent Limitation Determines 1989 Farmland Assessments

Certified farmland assessed values for 1989, issued by the Illinois Department of Revenue to county assessing officers, reflect the restrictions of the 1986 assessment law amendment, which limits annual changes in certified values to 10 percent after 1988. The 1989 certified values will be used by assessors to determine the 1989 taxable value of farms, the basis for tax bills paid by landowners in 1990 and a major factor determining the fiscal health of rural schools and local governments in fiscal year 1991.

The 1986 assessment law amendment was an attempt to insulate rural tax bases from the poor performance of the farm economy by phasing in significant reductions in farmland assessments associated with the farm recession. The legislation retards the rate of adjustment in rural property tax bases and masks the implications of the fundamental economic changes in farming and the rural economy of Illinois for the adequate and equitable financing of rural governments and rural school districts.

The 1986 "limit law" may have temporarily reduced fiscal stress on rural schools and rural governments heavily dependent on farm property tax revenues, but it has allowed state policymakers to delay recognizing and addressing the significant loss in taxing capacity across rural Illinois. This loss threatens the ability of schools and governments to provide essential services, and it may limit efforts to revitalize rural economies.

1989 Farmland Certified Values

Local officials are provided a certified value (dollars per acre) for each soil productivity index for soils that are cropped. Using these values and the soils identified in a farm, assessors determine the farm's assessed value. Assessors consider slope and erosion factors when assessing individual parcels of farmland. Flood hazards should also be considered in the taxable value of a farm because flooding reduces productivity.

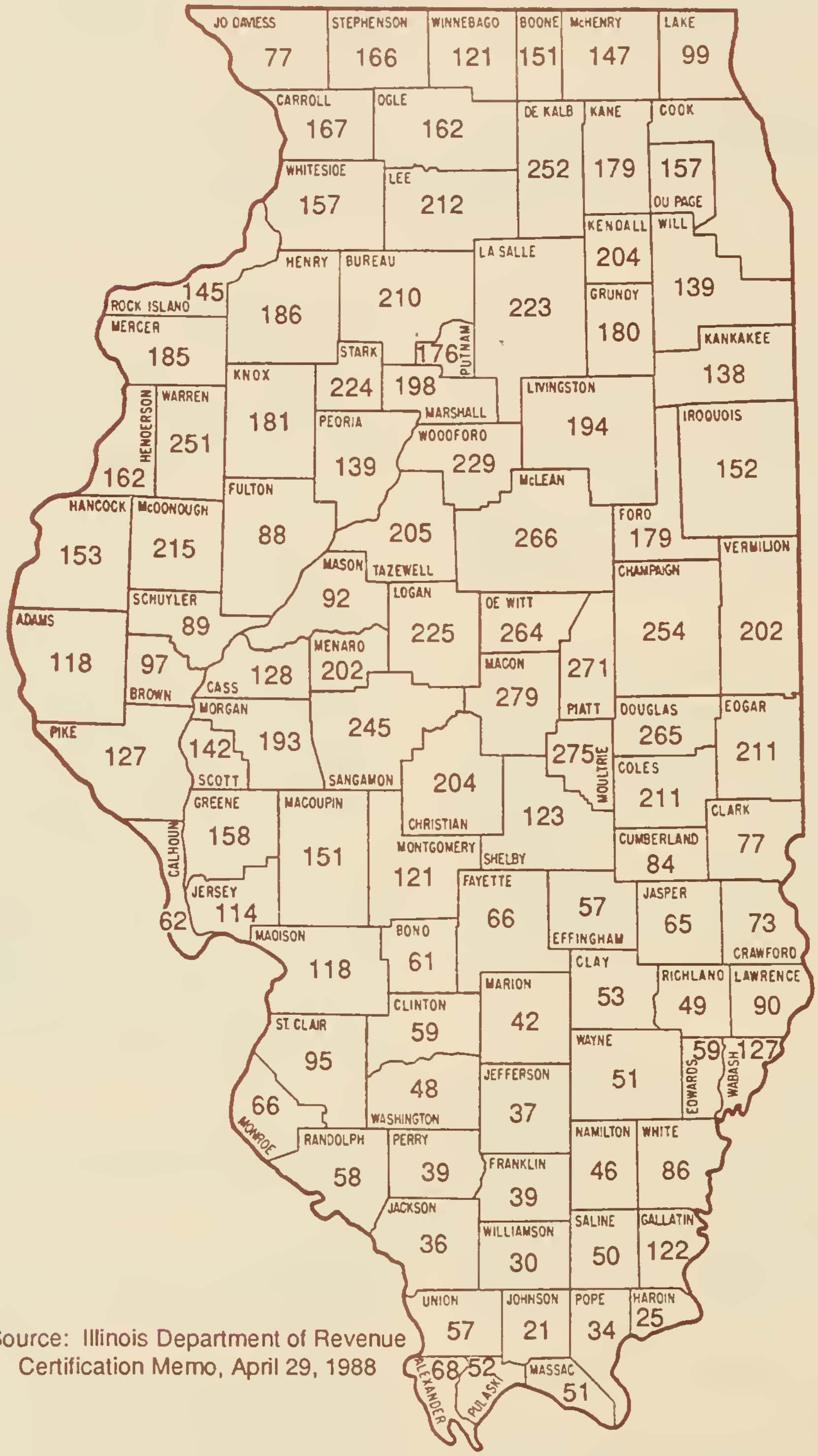
In addition to certified values, the state provides each county with the expected average per acre assessment for all farmland and cropland in the county. These averages provide local assessors and County Farmland Assessment Review committees with an indication of the expected average level of assessment after all farms are assessed with the new values. Unlike other real estate, which has to be reassessed every 4 years, farmland is reassessed every year, using new certified values.

The variation in certified average assessed values for counties across Illinois reflects differences in the ability of soils to grow corn, soybeans, and wheat, and differences in land use on farms. Assessed values are higher on more productive soils and lower on poorer soils on steep, tree-covered terrains.

Past and Expected Changes in Certified Farmland Assessed Values

The 1989 certified values issued to county assessing officials this spring were not determined by the income capitalization formula that uses 5-year average crop prices, nonland production costs, and Federal Land Bank mortgage interest rates. The 1989 values represent 90 percent of the 1988 values certified in the spring of 1987 because the 10-percent limit law restricts annual changes in

1989 Certified Average Farmland Assessments
(dollars per acre)



Source: Illinois Department of Revenue
Certification Memo, April 29, 1988

certified values. This limitation will be the determining factor in farmland assessments for several years as assessments decline gradually and reflect the economic conditions in agriculture.

Landowners, state policymakers, local elected officials, and school boards need to be able to anticipate the future level of farmland assessments because of their importance in determining individual tax bills and available tax revenues. The limit law and lags in the assessment cycle make a reasonably accurate picture of future certified values possible. Figure 1 illustrates past and expected changes in certified values for a soil type with a productivity index of 120.

From 1981 to 1986, the certified values were calculated using 5-year average data in the income capitalization formula. The index shows slight downward pressure in 1982 and 1983, a significant drop in 1984, and a strengthening of certified values in 1985 and 1986. The strengthening mainly reflects higher prices in 1983 because of the drought and the Payment-In-Kind program.

Beginning in 1987, the index reflects the 1986 limit law and the difference between calculated values and certified values. The limit law required that 1986 certified values be used for 1986 and 1987 farm assessments. The index was 80 in both years. The lower line in Figure 1 traces the index if calculated values had been certified; the upper line traces limit-law certified values between 1986 and 1989. The index after 1989 was estimated.

The 10-percent limit law determined the index of 65 for 1989 and the projected indexes through 1992. The lower line, after 1989, is an extrapolation of the 1988-1989 trend in calculated values. When will certified values reflect the farm economy and not the limit law? The projections in Figure 1 indicate that in 1992 the values will be determined by the income capitalization formula. Stronger crop prices for more than one year in a row could cause this to occur in 1991.

The projections suggest that if the rate of decline is 10 percent each year, certified values will catch up with the Illinois farm economy in 1992. For local schools and local governments, this means that the farmland component of their tax base will not stabilize until the 1993 fiscal-year budget. Several years of fiscal stress are ahead while local public economies in rural Illinois accommodate economic reality. Taxpayers will probably experience growing pressure for higher tax rates as jurisdictions struggle to maintain current nominal property tax revenues. Changes in state tax and spending policies, especially in the financing of schools, could relax pressures on tax rates.

Summary

For the second year in a row, the certified values issued to county assessing officers for setting individual farm assessments reflect the 10-percent limit law. Phasing the economic problems of the farm sector into rural tax bases, the intention of this 1986 law, will not be complete until well into the next decade. The limit law may be easing fiscal stress on rural schools and local governments, but it masks the real impact of the economic changes in rural Illinois on local public economies. In doing so, it delays recognition of the fundamental changes in the taxing capacity of rural Illinois schools and local governments and pushes consideration of appropriate state tax and spending policies into the future. While discussions about tax reform continue, significant and fundamental changes are under way in rural public economies across Illinois. These changes will substantially affect the educational opportunities of rural students, the level of rural road services, and other basic services required for vitality in rural Illinois.

Prepared by:

David L. Chicoine
Extension Economist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

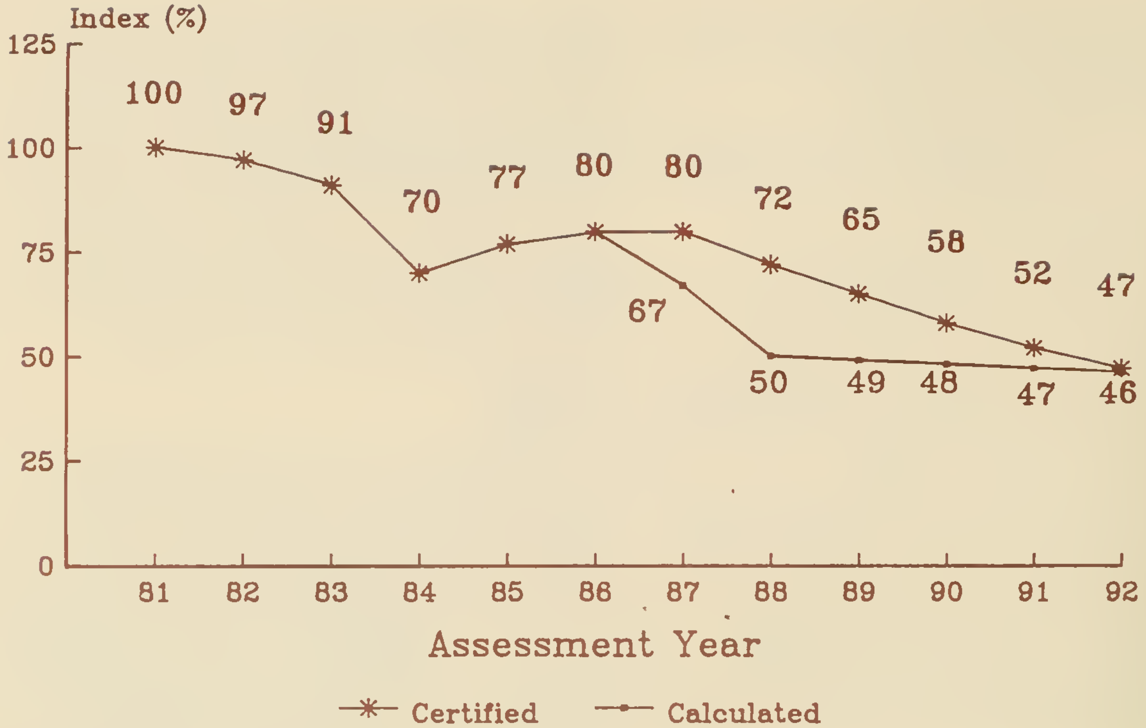


Figure 1. Index of certified and calculated assessed values for soils with a productivity index of 120, 1981 to 1989, with projections to 1992.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-12 *July 1988*

Financial Effects of a Drought on Illinois Cash Grain Farms

Dry weather throughout most of the nation's heartland, including Illinois, has sparked a tremendous boost in grain prices, especially for corn, soybeans, and wheat. High prices are no consolation, however, for farmers who have little or no product to sell. The extent of the damage is not fully known at this time. Adequate rainfall for the remainder of the growing season would reduce yield losses and would probably lead to lower prices.

Farmers and their lenders are concerned about the financial consequences of the drought. Will the recovery in agriculture be choked off, or will higher prices more than offset the decline in yields? The answer, of course, varies from one farming operation to the next. The severity of yield losses varies widely, depending upon weather conditions, soil quality, and the time the crops were planted. In addition, the current high prices have given the astute marketer the opportunity to lock in very favorable prices for the 1989 crop year and beyond.

Clearly, the effects of the drought will extend well beyond the current year. If farmers are unable to repay operating loans this fall and winter, the effects of higher debt loads could remain for an extended period. This report will estimate the long-term financial consequences of the drought on Illinois grain farms.

Projected Financial Outcomes

This report projects the financial situation on typical Illinois cash grain farms using three price scenarios. The price scenarios are intended to reflect modest, medium, and heavy yield losses for the nation as a whole. The higher the national yield loss, the higher the prices and the more likely the elimination of government set-aside requirements.

No matter what the national outcome is, yields on individual farms will vary widely. We simulated four yield levels (0, 40, 70, and 100 percent of normal production in 1988) and two initial debt-to-asset ratios (20 percent and 50 percent). It is assumed that yields will return to normal after the 1988 crop year. Assumptions about farm size, production costs, and crop mix are based upon northern and central Illinois grain farms in the Farm Business Farm Management Association.

The base farm for these simulations consists of 651 tillable acres with 55 percent of the tillable land in corn production or set aside and 45 percent in soybeans. The operator is assumed to own half of the land and share-rent the other half on a 50-50 crop-share basis.

The economic situation of the base farm is projected for four years--from 1988 through 1991. We assume that land values will remain constant over the four-year period. Capital is replaced each year to maintain existing capital stock. The interest rate on all debt is assumed to be 10.5 percent for each of the next four years. In each situation, off-farm income is assumed to be $8,500 per year and family living expenses are assumed to be $24,000. Family living expenses and production costs (for example, seed, fertilizer, fuel, and repairs) are assumed to grow at the rate of 2 percent per year. Normal crop yields are assumed to be 143 and 45 bushels per acre for corn and soybeans, respectively. We assumed that crop insurance for 1988 was not purchased for this farm. In the base runs, we also assumed no special federal drought assistance program. A separate set of runs was completed to evaluate possible drought assistance measures.

Table 1 identifies various yields (as a percent of normal) and prices of corn and soybeans to project the financial situation on Illinois grain farms. These prices and yields were chosen arbitrarily to reflect a range of possible outcomes on individual farms; they should not be viewed as actual forecasts of the future. Much higher or lower prices may be achieved on individual farms as a result of hedging activities.

Initial debt-to-asset ratio of 20 percent

Results of the four-year simulation for the base farm with an initial debt-to-asset ratio of 20 percent are shown in Tables 2, 3, and 4. Although the projection model generates a complete balance sheet, income statement, and cash flow projection, only selected highlights are presented here.

If this farm receives enough rainfall to achieve a normal yield, net farm income in 1988 and beyond will be strong because commodity prices will be high. In this scenario, the farm operator will make substantial profits and will benefit from adverse conditions on other farms.

If yields on the base farm are only 70 percent of normal in 1988 and return to normal in 1989 and beyond, net farm income will be reduced but not enough to threaten the financial soundness of the farm.

Yields that are only 40 percent of normal would cause a large loss in income for 1988. This scenario assumes no crop insurance or disaster relief payments from the federal government. After 1988, income would again be positive, but the operator would probably be forced to carry an operating line of credit for a number of years. Net worth would decline during 1988 and then rebound in the next three years.

The ability of the operator to reduce the operating line of credit over time depends upon the price scenario used. A lender dealing with this borrower would need to recognize the cause of this situation. Funding the shortfall in operating revenue with a term loan rather than with an operating loan might be considered.

If the base farm has a total crop loss during 1988, the financial consequences will be severe. Operating losses would total over $110,000 in 1988. Borrowing would need to increase dramatically to cover this loss. If these losses were financed with borrowed funds, the farm's net worth would be lower after four years than it is at present.

Initial debt-to-asset ratio of 50 percent

If a farm had an initial debt-to-asset ratio of 50 percent, normal yields in 1988 combined with high commodity prices would lead to an income level that would probably cause some growth in net worth during 1988 (Tables 5, 6, and 7). The lower commodity prices assumed for 1989 and beyond, however, would cause both net income and net worth to deteriorate. The operating line of credit would need to continue to expand rapidly for this operator to remain in business.

If an operator with this initial financial position experiences only 70 percent of normal yields in 1988, net income will be sharply reduced in 1988. For 1989 and beyond, the net income could be either positive or negative depending upon the price scenario used.

If yields for a farmer in this type of initial financial position were 40 percent of normal or less in 1988, the financial consequences would be disastrous. Even a return to normal yields in 1989 and beyond would probably not reverse the deteriorating financial position of this farm. Under these yield conditions, the net worth of the operator would continue to decline and the need for borrowed funds would probably exceed the amount most lenders would be willing to provide. Operators in this precarious financial position would need to give serious consideration to the long-term viability of their farming operations. They may need to liquidate some of their assets to reduce the tremendous debt burden on their farming operations.

Drought assistance

There is widespread belief that some form of federal assistance will be made available to farmers who suffer severe losses as a result of the drought. Assistance alternatives could include allowing a retroactive sign-up for crop insurance, not requiring repayment of advance deficiency payments, and using money saved by reduced deficiency payments as a form of disaster relief payment.

A key provision in such relief measures will probably be assistance based upon the amount of losses. To model this form of assistance, we evaluated the possibility of making the maximum deficiency payment in 1988, $1.21 per bushel on corn, available to producers in proportion to their yield losses. For example, a producer with a 100-percent yield loss would receive 100 percent of the maximum deficiency payment; a producer with a 60-percent yield loss would receive 60 percent of the maximum deficiency payment; and a producer with no yield loss would receive no deficiency payment unless the market price were below the target price. The outcomes of this form of financial assistance are shown in Tables 8 and 9. Comparing these two tables with Tables 3 and 6 shows the degree to which financial outcomes change as a result of this form of financial assistance.

Assistance in this form would certainly provide some degree of financial assistance to agricultural producers hit hard by drought. However, producers would not be "made whole" by such assistance. Producers experiencing heavy yield losses would probably still suffer large losses in 1988, and the financial consequences of those losses would extend to 1989 and beyond.

Summary

Financial consequences of the drought situation will depend upon the degree of yield losses and the extent to which future commodity prices remain high because of the current production shortage. Farmers who start from a strong financial position can absorb a 30-percent reduction in yield with few problems. A 60-percent or higher reduction in normal yields for 1988, however, would probably lead to reliance on borrowed funds well into the future.

Farmers who start from a weaker financial position are likely to be adversely affected by even a 30-percent yield reduction. Higher yield losses in 1988 would probably lead to a rapidly deteriorating financial position in the future. The need for borrowed funds to sustain operations could be so strong that few lenders would be willing to provide the necessary funds. Operators in this position should carefully evaluate the future viability of their farming operations. Liquidation of assets may be necessary to reduce the large amount of debt capital required to maintain the existing operation. Disaster relief assistance from the federal government could provide some help, but farmers experiencing the most drastic yield reductions will probably suffer the financial consequences of the drought for some time.

Prepared by:

David Lins
Extension Specialist
Farm Financial Management

David Neff
Agricultural Economist

Issued by:

David Lins

David Lins

Table 1. Commodity Prices and Yields Used to Project the Financial Situations of Illinois Cash Grain Farms

	Year			
	1988	1989	1990	1991
	percent			
Yields as a percent of normal on individual farms	0	100	100	100
	40	100	100	100
	70	100	100	100
	100	100	100	100
	dollars per bushel			
Price scenario I				
Modest national yield losses				
Cash corn	2.75	2.50	2.35	2.25
Target price	2.97	2.88	2.75	2.75
Deficiency payment rate	0.22	0.38	0.40	0.50
Soybeans: cash price	7.50	7.00	6.50	6.00
Price scenario II				
Medium national yield losses				
Cash corn	3.25	2.75	2.55	2.40
Target price	2.97	2.88	2.75	2.75
Deficiency payment	0.00	0.13	0.20	0.35
Soybeans: cash price	8.50	7.75	7.00	6.25
Price scenario III				
Large national yield losses				
Cash corn	3.75	3.00	2.75	2.50
Target price	2.97	2.88	2.75	2.75
Deficiency payment rate	0.00	0.00	0.00	0.25
Soybeans: cash price	9.50	8.50	7.50	6.50

Table 2. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 20 Percent, 20-Percent Set-Aside Program: Price Assumption Scenario I

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$47,713	$ 132	($47,448)	($110,889)
1989	41,326	38,425	33,429	26,768
1990	30,819	30,398	24,890	17,529
1991	24,698	24,245	18,376	10,456
Operating loan balance:				
Initial	$18,898	$18,898	$18,898	$18,898
End of year				
1988	0	27,628	75,208	138,648
1989	0	4,010	56,470	126,571
1990	0	4,307	60,208	135,636
1991	0	12,470	72,559	153,661
Net worth:				
Initial	$810,149	$810,149	$810,149	$810,149
End of year				
1988	834,267	786,687	739,107	675,667
1989	844,373	809,016	756,556	686,455
1990	846,130	811,237	755,336	679,908
1991	845,258	809,798	749,709	668,607
Debt-to-asset ratio	0.18	0.19	0.25	0.33

Table 3. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 20 Percent, 10-Percent Set-Aside Program: Price Assumption Scenario II

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$67,418	$12,258	($42,902)	($116,449)
1989	59,928	58,300	52,508	44,786
1990	46,104	46,104	42,655	34,122
1991	37,416	37,416	34,699	25,517
Operating loan balance:				
Initial	$18,898	$18,898	$18,898	$18,898
End of Year				
1988	0	15,503	70,662	144,208
1989	0	0	32,845	114,113
1990	0	0	25,880	113,326
1991	0	0	28,423	121,354
Net worth:				
Initial	$810,149	$810,149	$810,149	$810,149
End of Year				
1988	853,972	798,812	743,653	670,107
1989	877,531	837,953	780,181	698,913
1990	890,138	849,143	789,664	702,218
1991	897,893	855,308	793,845	700,914
Debt-to-asset ratio	0.17	0.17	0.21	0.30

Table 4. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 20 Percent, No Set-Aside Acreage: Price Assumption Scenario III

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$92,683	$29,944	($32,796)	($116,449)
1989	75,672	75,672	69,314	60,530
1990	54,473	54,473	53,850	44,144
1991	43,292	43,292	43,292	33,594
Operating loan balance:				
Initial	$18,898	$18,898	$18,898	$18,898
End of year				
1988	0	0	60,555	144,208
1989	0	0	5,932	98,369
1990	0	0	0	92,362
1991	0	0	0	96,612
Net worth:				
Initial	$810,149	$810,149	$810,149	$810,149
End of year				
1988	879,238	816,498	753,760	670,107
1989	911,411	867,614	807,094	714,657
1990	928,948	883,505	822,646	723,182
1991	941,593	894.386	831,857	725,656
Debt-to-asset ratio	0.16	0.17	0.18	0.28

Table 5. Projected Financial Situations of Northern and Central Illinois Cash-Grain Farms with an Initial Debt-to-Asset Ratio of 50 Percent, 20-Percent Set-Aside Program: Price Assumption Scenario I

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$15,813	($31,768)	($79,348)	($142,789)
1989	9,016	4,020	(976)	(7,637)
1990	(2,534)	(7,607)	(13,128)	(20,488)
1991	(11,146)	(16,598)	(22,631)	(30,755)
Operating loan balance:				
Initial	$ 47,246	$ 47,246	$ 47,246	$ 47,246
End of year				
1988	57,014	104,593	152,174	215,614
1989	91,712	140,023	192,600	262,701
1990	140,182	192,113	249,562	326,936
1991	199,829	257,163	320,645	406,143
Net worth:				
Initial	$506,342	$506,342	$506,342	$506,342
End of year				
1988	506,601	459,022	411,441	348,001
1989	495,373	447,062	394,485	324,384
1990	474,180	422,249	364,800	287,426
1991	446,016	388,682	325,200	239,702
Debt-to-asset ratio	0.56	0.61	0.68	0.76

Table 6. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 50 Percent, 10-Percent Set-Aside Program: Price Assumption Scenario II

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$35,518	($19,642)	($74,802)	($148.348)
1989	29,687	23,895	18,103	10,381
1990	16,341	11,038	4,638	(3,895)
1991	6,483	808	(6,078)	(15,260)
Operating loan balance:				
Initial	$47,246	$47,246	$47,246	$47,246
End of year				
1988	37,308	92,468	147,627	221,174
1989	57,514	108,023	168,974	250,243
1990	93,417	147,462	213,045	300,491
1991	139,811	197,912	268,428	364,218
Net worth:				
Initial	$506,342	$506,342	$506,342	$506,342
End of Year				
1988	526,307	471,147	415,988	342,441
1989	529,571	479,062	418,111	336,842
1990	520,945	466,900	401,317	313,871
1991	506,034	447,933	377,417	281,627
Debt-to-asset ratio	0.50	0.55	0.62	0.72

Table 7. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 50 Percent, No Set-Aside Acreage: Price Assumption Scenario III

	100% yield	70% yield	40% yield	0% yield
Net farm income:				
1988	$ 60.783	($1,956)	($64,696)	($148,348)
1989	48,084	41,496	34,909	26,125
1990	28,372	23,105	15,832	6,126
1991	16,565	10,987	3,252	(7,182)
Operating loan balance:				
Initial	$ 47,246	$ 47,246	$ 47,246	$ 47,246
End of year				
1988	12,043	74,783	137,521	221,174
1989	22,636	72,800	142,062	234,499
1990	53,364	106,486	180,154	279,530
1991	93,348	150,440	229,623	336,472
Net worth:				
Initial	$506,342	$506,342	$506,342	$506,342
End of year				
1988	551,572	488,832	426,094	342,441
1989	564,449	514,285	445,023	352,586
1990	560,998	507,876	434,208	334,832
1991	552,497	495,405	416,222	309,373
Debt-to-asset ratio	0.45	0.51	0.58	0.69

Table 8. Projected Financial Situations of Northern and Central Illinois Cash-Grain Farms with an Initial Debt-to-Asset Ratio of 20 Percent, 10-Percent Set-Aside Program with Partial Deficiency Payment (DP): Price Assumption Scenario II

	100% yield, 0% DP	70% yield, 30% DP	40% yield, 60% DP	0% yield, 100% DP
Net farm income:				
1988	$67,418	$23,007	($21,404)	($80,619)
1989	59,928	59,429	54,766	48,548
1990	46,104	46,104	45,150	38,279
1991	37,416	37,416	37,383	29,990
Operating loan balance:				
Initial	$18,898	$18,898	$18,898	$18,898
End of year				
1988	0	4,754	49,163	108,378
1989	0	0	9,088	74,521
1990	0	0	317	70,724
1991	0	0	1,086	76,071
Net worth:				
Initial	$810,149	$810,149	$810,149	$810,149
End of Year				
1988	853,972	809,561	765,152	705,937
1989	877,531	846,550	803,938	738,505
1990	890,138	857,869	815,227	744,820
1991	897,893	864,369	821,182	746,197
Debt-to-asset ratio	0.17	0.17	0.18	0.26

Table 9. Projected Financial Situations of Northern and Central Illinois Cash Grain Farms with an Initial Debt-to-Asset Ratio of 50 Percent, 10-Percent Set-Aside Program with Partial Deficiency Payment (DP): Price Assumption Scenario II

	100% yield, 0% DP	70% yield, 30% DP	40% yield, 60% DP	0% yield, 100% DP
Net farm income:				
1988	$35,518	($8,893)	($53,304)	($112,518)
1989	29,687	25,024	20,361	14,143
1990	16,341	12,285	7,132	262
1991	6,483	2,150	(3,394)	(10,787)
Operating loan balance:				
Initial	$47,246	$47,246	$47,246	$47,246
End of year				
1988	37,308	81,719	126,129	185,344
1989	57,514	96,145	145,218	210,651
1990	93,417	134,682	187,484	257,890
1991	139,811	184,171	240,944	317,248
Net worth:				
Initial	$506,342	$506,342	$506,342	$506,342
End of year				
1988	526,307	481,896	437,486	378,271
1989	529,571	490,940	441,867	376,434
1990	520,945	479,680	426,878	356,472
1991	506,034	461,674	404,901	328,597
Debt-to-asset ratio	0.50	0.54	0.60	0.67

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-13 *August 1988*

Farm and Family Sources and Uses of Dollars in Illinois, 1984 through 1987

In 1987, the total noncapital family-living expenses of farm operators in a group of 328 record-keeping farms averaged $25,439, or $2,120 per month per family (Table 1). The farms were located primarily in central Illinois. This average was 1.9 percent higher than in 1986 and 4.9 percent higher than in 1984 and 1985. Another $4,011 was used to purchase capital items, such as the personal share of the family automobile, furniture, and household equipment. Thus, the grand total for living expenditures averaged $29,450 for 1987 compared with $28,742 for 1986, a $708 increase per family. Expenditures for capital items increased $234 per family while noncapital expenses increased $474 per family.

How these families use their funds depends somewhat on the levels of net farm and nonfarm incomes and the priority they assign to expenditures. In this sample, 1987 net farm income increased significantly while net nonfarm income increased only slightly from 1986. Net farm income increased $10,833 per farm and net nonfarm income increased $156 per farm, compared to 1986. Most of the farms in the sample were grain farms located in a 15-county area bounded by Jacksonville, Peoria, Champaign, and Mattoon. Grain yields in 1987 were very good--although not at record high levels--and total costs remained relatively stable. Selected cost items such as machinery depreciation and interest expense decreased. Good livestock prices and low feed costs boosted incomes on livestock farms.

The amount of interest paid per farm decreased from $20,421 in 1986 to $14,966 in 1987. Interest paid as a percent of farm receipts dropped from 12.2 percent in 1986 to 8.5 percent in 1987. As a percent of cash operating expenses, interest paid dropped from 16.8 percent in 1986 to 11.9 percent in 1987. Low interest rates, reduced reliance on borrowed money, and extensive use of Commodity Credit Corporation (CCC) loans account for the lower amounts of interest being paid. Farm receipts per tillable acre increased $7; cash operating expenses, including interest, increased $3. Interest payments per tillable acre decreased from $31 to $23, while noncapital living expenditures remained the same at $38 per tillable acre. Machinery and building purchases decreased from $16,603 in 1986 to $13,808 in 1987.

Data recorded by the sample farmers, edited by the Farm Business Farm Management Association (FBFM) field staff, showed an average debt of 61 cents for each dollar of farm assets on December 31, 1987; machinery was valued on a cost-less-depreciation basis. The amount of debt for each dollar of assets was 60 cents on December 31, 1986. Although the value of farm assets has declined, the amount of debt per farm also declined. The debt-to-asset ratio would be lower if machinery were valued at a current market value or if nonfarm assets were considered.

The farms in this sample were 71 acres larger, on average, than the 7,500 farms in the Illinois FBFM record-keeping program. Crop yields averaged about 5 percent above those reported by the Illinois Crop Reporting Service. For the first year in many years, net farm income from this sample of farms was less than the average of all Illinois record-keeping farms. The average net farm income of all Illinois record-keeping farms was $39,753, or $3,365 more than the average net farm income from this sample. Average living expenditures for farms in this sample were estimated to be 15 to 20 percent above the average of

Table 1. Average Farm and Family Sources and Uses of Dollars and Living Expenditures for 1984 through 1987 and by High and Low Noncapital Living Expenses

	All records, average per farm				Family of 3 to 5, 1986[a]	
	1987	1986	1985	1984	High third	Low third
Number in sample	328	324	313	286	70	70
Tillable acres farmed	665	651	629	602	812	506
Acres owned	119	124	119	112	128	104
Farm assets, January 1[b]	$327,059	$361,276	$378,911	$425,399	$371,470	$260,355
Farm assets, December 31[b]	326,706	356,244	383,228	420,570	370,242	362,397
Liabilities, January 1	203,647	223,214	220,968	212,048	243,394	154,540
Liabilities, December 31	199,282	212,064	234,155	219,049	236,348	153,067
Net farm income	36,388	25,555	25,677	13,573	42,649	29,642
Sources of dollars						
Net nonfarm income	$ 8,682	$ 8,526	$ 8,721	$ 9,208	$ 5,516	$ 8,106
Money borrowed	129,694	123,445	137,065	96,895	171,594	90,687
Farm receipts	176,181	167,938	157,042	146,213	198,768	145,193
Uses of dollars						
Interest paid	$ 14,966	$ 20,421	$ 22,144	$ 20,651	$ 18,690	$ 10,828
Cash operating expenses	111,011	100,983	96,761	90,621	118,713	96,831
Capital farm purchases	13,808	16,603	15,589	15,871	17,397	12,631
Payments on principal	134,024	134,604	123,430	90,191	179,145	91,871
Income and Social Security taxes	7,287	3,762	4,358	4,823	7,136	5,351
Net new savings and investment	4,011	-5,206	13,320	3,346	-3,974	4,922
Living expenses						
Contributions	$ 1,224	$ 1,236	$ 1,145	$ 1,121	$ 1,944	$ 645
Medical	3,264	3,226	3,146	3,126	3,867	2,646
Insurance, life and disability	2,111	2,139	2,209	2,197	2,673	1,115
Expendables	18,840	18,364	17,735	17,803	26,657	12,980
Total noncapital expenses	(25,439)	(24,965)	(24,235)	(24,247)	(35,141)	(17,386)
Capital	4,011	3,777	2,991	2,466	3,630	4,166
Total living expenses	$ 29,450	$ 28,742	$ 27,226	$ 26,713	$ 38,771	$ 21,552
Percent change, total noncapital living expenses	1.9	3.0	0.0	3.9		

[a] Records were sorted into high- and low-third categories according to total noncapital living expenses.

[b] Modified cost basis, except bare land values were held at current values between January 1 and December 31.

all Illinois farm operators having more than $40,000 gross sales per farm because average net farm income for this sample is usually higher than the average for all Illinois farms.

In 1987, the operators of the 328 sample farms averaged 44 years of age. The average family had 3.5 members; the oldest dependent child was 9 years old. The sample farms were, on average, 665 tillable acres; the operators owned, on average, 18 percent of this land, or 119 acres. Records were kept so that all sources of funds, both farm and nonfarm, balanced with all uses of funds in a complete monthly cash-flow accounting system.

In Table 1, the averages for total family living expenses per farm are divided into five categories for 1984 through 1987. The "expendables" category includes cash spent for food, operating expenses, clothing, personal items, recreation, entertainment, education, and transportation. Cash spent for capital improvements exceeding $250 is not included. The use of a rented house on an estimated 40 to 50 percent of the farms in this sample is not included because these data cover only cash outlays.

The excess on nonfarm taxable income over nonfarm business expense was $8,682 in 1987, or 29 percent of the total living expense; in 1986, the excess was 30 percent. This includes dividends on stocks, interest on savings and money-market funds, income from other nonfarm investments, and income from off-farm labor performed by family members. Interest earned and left in savings accounts not included in the cash flow is not reflected in the nonfarm income.

While the value of farm assets for this sample of 328 farms continues to decline, the amount of liabilities has also decreased when compared to a year earlier. The value of farm assets on December 31, 1987, was $29,538 less than a year earlier, reflecting the continued drop in land values. Recent surveys indicate that land values are now starting to increase; this will be reflected in the 1988 asset values for these farms. At the same time, liabilities decreased by $12,782. These farm operators borrowed $6,249 more and made $580 less in principal payments than they did a year earlier. The $13,808, or $21 per tillable acre, spent on capital purchases for machinery and equipment was less than half the level of capital purchases common before 1980.

Although interest payments continue to be one of the highest farm expense items, the amount of interest paid in 1987 declined significantly compared to 1986. The amount of cash interest paid in 1987 was the lowest since 1980. This includes interest paid on operating, intermediate, and real-estate debt. Interest paid increased from 12 percent of the total farm operating expense in 1979 to 21 percent in 1983 and dropped to 12 percent in 1987. The interest payment of $14,966 in 1987 was 8.5 percent of total cash farm receipts, down from 12 percent in 1986.

The records from farm families with three to five persons were sorted into three categories, and the high third and the low third were compared, according to their noncapital living expenses. Total living expenses for the high-third group averaged $38,771, compared with $21,552 for the low-third group. The high-third group farmed 306 more acres than the other group and owned 16 percent of the land farmed; the low-third group owned 21 percent of the land farmed.

The larger farms in the first group had more income for living expenses and income tax. Net farm plus nonfarm income was $48,165 for the high-third group, compared with $37,748 for the low-third group. The average age of operators in both groups was 41; the number of family members in the high-third group was 4.2, compared with 3.8 family members for the other group. Subtracting total living expenses from the total of net farm and nonfarm income results in a balance of $9,394 for the high-third group and $16,196 for the low-third group.

Net farm incomes improved last year compared to previous years. However, dry weather conditions in 1988 will lower crop yields and result in lower net farm incomes, requiring farm operators to closely monitor all receipts and expenditures. It is therefore important that more farmers learn how to balance and monitor their cash flow each month. Computer program assistance is becoming available in more service centers, such as some FBFM Association district offices. These centers are prepared to help farmers project monthly cash flow on computer printouts so that they can compare projections with their actual results. This type of accounting is essential for farm operators with low equity or very high debt-to-asset ratios. These operators need to account for all of their income and expenditures so they can make sound financial management decisions.

The data summarized in this process may also serve as a guide in budgeting allowances for family living expenses. For families in this sample, the family living expenses totaled $44 for each tillable acre farmed. If the net nonfarm income of $13 per tillable acre is used for living expenses, $31 per tillable acre would have to be generated from the farm business to meet family living requirements. Each family must determine how much each acre of crop or each litter of hogs should contribute to their family living expenses. This amount, when added to production costs and other obligations, can help to determine break-even prices when products are sold.

Prepared by:
Dale Lattz
Extension Specialist
Farm Management

Issued by:
Dale H. Lattz
Dale Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-14 *August 1988*

Will the Drought Cause a Decline in Land Prices?

In a July 1 survey of land appraisers and land brokers about farmland prices, we asked: What effect do you think the drought will have on farmland prices? Responses were mixed. Many thought that it was too early to tell. Since then, we have had another month of drought with only scattered showers to help the crops. The damage appears to be done, and rain from here on out may have little effect on the final outcome.

First of all, respondents believed that farmland prices in Illinois on above-average farmland were 23 percent higher than they were a year ago, while prices on below-average land were up only 6 percent from a year ago. This shows a widening divergency between above-average and below-average land and means that prices for the top-quality land have rebounded at least 25 percent since the bottom was reached in the fall of 1986.

Demand is good and the supply of land on the market has declined. Most insurance companies and the Farm Credit System have reduced their land inventories to close to a current basis (that is, takeovers no longer exceed sales). This is a strong note for the land market. Many of the sales made in 1986 and 1987 were for cash or to buyers with high equity, so much of the land that has changed hands recently has been purchased by farmers and financially able, long-term investors.

If the drought pushes additional landowners into insolvency, this situation could change. It may not be a significant problem because the financial health of many remaining operators was getting better in 1986 and 1987. The government drought payments will help some through a tight year.

Machinery sales were booming this spring, with the number of new units exceeding any spring period since 1979. Hearsay reports indicate that sales have now slowed or stopped, so the drought is affecting farmers' willingness to purchase large-ticket items. This psychology will probably carry over into the land market at least in the short run, even though we all know that land is a long-term investment and should not be affected by short-term variations.

The drought *is* depleting our surpluses, especially of wheat and soybeans. Inventories of corn will also be down to a much more manageable level. Usage of all crops will be much larger than carry-over for the first time since 1983.

South America and China are experiencing some crop shortage problems. A supply and demand situation similar to the one that existed in 1973 may be developing. That situation resulted in higher crop and land prices for some years.

Survey respondents believed that the drought may be no more than an interruption in the upward trend of farm land prices that began over a year ago. None expected the drought to cause land prices to fall below the 1986 bottom, although they believed there would be a short-term decline.

The drought will probably cause land returns "from the marketplace" to increase in 1989 (assuming there is a normal crop), and certainly they will increase in the early 1990s. This means that land prices will probably go up a year or so from now. But, be cautious: "From the marketplace" means higher prices for commodities but lower government subsidies. Per acre government payments during the 1970s dropped to near zero, but they increased to a very significant level, 30 percent of cash rent, by 1986. Payments have continued to be as high or higher in 1987; 1988 payments may be just as high because of the drought and the desire of politicians to help farmers. Payments will probably decline significantly beginning in 1989.

Don't get caught in an inflationary psychology. Most farmers buy land to keep as a long-term investment, not to speculate on; after they buy, they don't want to sell. If you don't contemplate selling, mortgage payments *must be made from income* on a long-term basis. Because current returns are still significantly below mortgage interest rates, buyers should put high equity in the land they purchase (Table 1). Mortgage payments can't be made from increases in land values unless you sell. When the rate of return is below the mortgage rate and buyers have high leverage, it doesn't take long to consume the equity.

Table 1. Percent Equity Required for Land Returns to Pay Mortgage Payments with Various Rates

Difference in rate[1]	**Land return rate**[2] 3%	4%	5%	6%	7%	8%
0	0	0	0	0	0	0
1	25	20	17	14	13	11
2	40	33	29	25	22	20
3	50	43	38	33	30	27
4	57	50	44	40	36	33
5	63	56	50	45	42	38
6	7	60	55	50	46	43
7	70	63	58	53	50	46
8	73	67	62	57	53	50

[1]This is the difference between the mortgage rate and the land return rate. On an amortized mortgage, the mortgage rate is the interest being paid plus the principal being paid. This will often be 1 percent more than the interest rate. For example, if the mortgage rate was 12 percent (11 percent interest + 1 percent principal) and the rate of return on land was 5 percent, look for the difference (7 percent) in the left-hand column and at the intersection of that row and the 5 percent land return column. You will find that 58 percent equity is needed for land returns to pay the mortgage payments. This allows no current return to equity except through potential land value increase.

[2]Land return rate = $100 \times \dfrac{\text{income}}{\text{value}}$

Prepared by:

John T. Scott, Jr.
Extension Specialist
Land Economics and Farm Management

Issued by:

John T. Scott, Jr.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-15 *September 1988*

The Disaster Relief Act of 1988 and Expected Incomes for Illinois Grain Farms

Introduction

Congress has passed and President Reagan has signed the Disaster Relief Act of 1988. Although this bill has received much publicity, questions remain as to how much assistance will be provided for individual farm operators and how the program will be implemented. With what is now known, some projections can be made about the amount of assistance producers can expect from the program. Many of the specific procedures for implementation of the program, however, are still forthcoming.

The intention of the bill is to assure a certain level of gross income for producers suffering yield losses from the drought. Payment rates are based on 65 percent of program yields (or county yields) multiplied by 65 percent of target prices (or average market prices). With average prices, this would result in gross incomes of approximately 42 percent (.65 x .65 = .42) of their normal levels. However, market prices are above average this year and provisions in the bill offer those with severe losses additional assistance.

Price and Yield Levels

For producers of government program crops such as corn and wheat, the base prices for drought relief payments will be the target price and loan rate. Producers who participated in the government set-aside program in 1988 will receive drought payments based on the target price, while nonparticipants' payments will be based on the county loan rate. The base price level for soybeans and other nonprogram crops is the average of the last five years' average prices, excluding the low and high averages.

For crops enrolled in the farm program, disaster payments will be based on the producer's farm program yield. Soybean payments will be based on the three previous years' county average yields, adjusted for adverse weather conditions. For other nonprogram crops, payments will be based on yields established by the Commodity Credit Corporation or on proven yields, if the producer can provide "satisfactory evidence" of actual yields on the farm for at least one of the three preceding crop years.

Three-Tier Payment Schedule

The Disaster Relief Act addresses three tiers of payments on crop losses. All three tiers apply to program crops, but the second and third levels are applicable to nonprogram crops. The prices for disaster relief payments are shown in Table 1. The three tiers of payments follow.

Tier 1. 65 to 100 percent of program yield

If the advance deficiency payments have been received but are unearned, the producer will be allowed to retain the part of that payment associated with the lost yield, up to 35 percent. For instance, if the program yield on corn is 100 bushels per acre and the actual yield is 80 bushels per acre, the producer will be allowed to retain the advance deficiency payment on the 20-bushel loss, or $8.80 per acre.

Tier 2. 25 to 65 percent of program or county average yield

Payments will be made at 65 percent of the drought price level (target, loan, or average market price) on the units of lost production between 65 percent of

Table 1. Drought Payment Rates for Program and Nonprogram Crops

	Base price	Rate, tier 2	Rate, tier 3
Program participants:			
Corn	2.93	1.90	2.64
Wheat	4.23	2.75	3.81
Nonparticipants:			
Corn	1.77	1.15	1.59
Wheat	2.21	1.44	1.99
Soybeans	5.54	3.60	4.99
Other nonprogram crops	5-year average, less high and low	x .65	x .90

the base yield (program or county average) and the actual production. If the actual yield is less than 25 percent of the base yield, the payment will be made on the lost production between 25 and 65 percent of the base yield.

Tier 3. 25 percent or less of program or county average yield

Payments will be made at 90 percent of the drought price level (target, loan, or average market price) on a loss below 25 percent of the base yield (program or county average) and the actual production.

Advance Deficiency Payments

Producers may be required to repay advance deficiency payments on the portion of the crop that received disaster payments (tiers 2 and 3). On the portion of the crop that is produced, repayment of advance deficiency payments or additional deficiency payments will depend on the national average price for the crop during the marketing year. Repayment of advance deficiency payments for bushels that receive disaster payments will not be due until July 31, 1989.

1988 Federal Crop Insurance

Producers who obtained federal crop insurance in 1988 will also receive disaster payments. The disaster payments may be reduced, however, if the total of the crop insurance and disaster payment exceeds a payment of 100 percent of the base yield (program or county average) multiplied by 100 percent of the base price (target of five-year average) for that commodity.

Payment Limitations

Producers will be limited to $100,000 in drought assistance benefits. There is a separate limit of $50,000 for livestock feed assistance benefits.

1989 Federal Crop Insurance Enrollment Requirement

Producers who incur a 65-percent or more reduction in yields and receive disaster assistance payments will be required to enroll in the federal crop insurance program for the commodity on which the loss was incurred in at least the minimum levels for 1989. This requirement will not apply if the premium for federal crop insurance exceeds 25 percent of the benefits received under the disaster program or if the premium exceeds 125 percent of the premium in 1988. The 1989 crop insurance requirement may be appealed if the cost of the crop insurance imposes financial hardship on the producer.

Examples for Central and Southern Illinois

Examples of expected drought payments and market returns are illustrated in Tables 2 and 3 for central and southern Illinois, respectively. For both regions, we assume that 44 percent of the acreage is planted in soybeans, 45 percent in corn, and the remaining 11 percent set aside as required for participation under the 1988 provisions of the government program. For these examples, it is assumed that the producer will receive an average price of $2.80 per bushel for his marketable corn and $8.00 per bushel for soybeans. However, the

Table 2. Expected Per-Acre Returns Under the Disaster Relief Act of 1988 for Central Illinois Grain Farms

		Corn	Soybeans			
Program or county yield		122.00	42.00			
Market price		2.80	8.00			
National average price		2.75	8.00			
Corn:						
Percent of average farm yield		100.00	70.00	50.00	30.00	0.00
Actual yield		130.00	91.00	65.00	39.00	0.00
Market returns		364.00	254.80	182.00	109.20	0.00
DROUGHT BENEFITS						
Yield 65-100%	122.00	0.00	13.64	18.79	18.79	18.79
Cash payments						
Yield 25-65%	79.30	0.00	0.00	27.17	76.57	92.72
Yield 0-25%	30.50	0.00	0.00	0.00	0.00	80.52
Cash receipts 1988		417.68	308.48	262.85	239.45	226.92
Earned deficiency payment		21.96	16.38	11.70	7.02	0.00
Disaster def. repayment		0.00	0.00	6.29	17.73	34.89
Normal def. repayment		31.72	23.66	16.90	10.14	0.00
Gross crop returns		385.96	284.82	239.66	211.58	192.03
Variable costs		139.20	125.94	117.10	108.26	95.00
Net crop returns		246.76	158.88	122.56	103.32	97.03
Soybeans:						
Percent of average farm yield		100.00	85.00	70.00	55.00	20.00
Actual yield		42.00	35.70	29.40	23.10	8.40
Market returns		336.00	285.60	235.20	184.80	67.20
Drought payment						
Yield 25-65%	27.30	0.00	0.00	0.00	15.12	60.48
Yield 0-25%	10.50	0.00	0.00	0.00	0.00	10.48
Gross crop returns		336.00	285.60	235.20	199.92	138.16
Variable costs		80.49	79.10	77.72	76.33	73.10
Net crop returns		255.51	206.50	157.48	123.59	65.06

Farm returns above variable costs:

		Corn				
	Yield	130	91	65	39	0
	42	223.47	183.92	167.58	158.92	156.09
	36	201.90	162.35	146.01	137.35	134.52
Soybeans	29	180.33	140.79	124.44	115.79	112.95
	23	165.42	125.87	109.53	100.87	98.04
	8	139.67	100.12	83.78	75.12	72.29

examples include a national average corn price of $2.75 per bushel. This price is an estimated average price for the marketing year used for figuring the earned deficiency payments on corn. The actual national average marketing year price will not be known until September 1989. The base prices for the corn and soybean drought payments as shown in Table 1 are $2.93 per bushel and $5.54 per bushel, respectively.

Five possible yield levels are depicted in Tables 2 and 3 for corn and soybeans. These yields are shown as a percent of the average farm yield. It is very important to remember that the drought payments are based on percentage of program or county average yields. However, producers are more likely to think of their 1988 yields as a percentage of last year's yield or the average of the last several years' yields. The five yield levels

Table 3. Expected Per-Acre Returns Under the Disaster Relief Act of 1988 for Southern Illinois Grain Farms

	Corn	Soybeans			
Program or county yield	87.00	28.00			
Market price	2.80	8.00			
National average price	2.75	8.00			
Corn:					
Percent of average farm yield	100.00	70.00	50.00	30.00	0.00
Actual yield	92.00	64.40	46.00	27.60	0.00
Market returns	257.60	180.32	128.80	77.28	0.00
DROUGHT BENEFITS					
Yield 65-100% 87.00	0.00	9.94	13.40	13.40	13.40
Cash payments					
Yield 25-65% 56.55	0.00	0.00	20.05	55.00	66.12
Yield 0-25% 21.75	0.00	0.00	0.00	0.00	57.42
Cash receipts 1988	295.88	218.60	187.13	170.57	161.82
Earned deficiency payment	15.66	11.59	8.28	4.97	0.00
Disaster def. repayment	0.00	0.00	4.64	12.74	24.88
Normal def. repayment	22.62	16.74	11.96	7.18	0.00
Gross crop returns	273.26	201.86	170.52	150.65	136.94
Variable costs	118.78	109.40	103.14	96.88	87.50
Net crop returns	154.48	92.46	67.38	53.77	49.44
Soybeans:					
Percent of average farm yield	100.00	85.00	70.00	55.00	20.00
Actual yield	28.00	23.80	19.60	15.40	5.60
Market returns	224.00	190.40	156.80	123.20	44.80
Drought payment					
Yield 25-65% 18.20	0.00	0.00	0.00	10.08	40.32
Yield 0-25% 7.00	0.00	0.00	0.00	0.00	6.99
Gross crop returns	224.00	190.40	156.80	133.28	92.11
Variable costs	73.16	72.24	71.31	70.39	68.23
Net crop returns	150.84	118.16	85.49	62.89	23.87

Farm returns above variable costs:

		Corn				
	Yield	92	64	46	28	0
	28	135.89	107.98	96.59	90.56	88.62
	24	121.51	93.60	82.31	76.19	74.24
Soybeans	20	107.13	79.22	67.94	61.81	59.86
	15	97.19	69.28	57.99	51.87	49.92
	6	80.02	52.11	40.83	34.70	32.75

for corn are 100, 70, 50, 30, and 0 percent of the average farm corn yield. Likewise, the levels for soybeans are 100, 85, 70, 55, and 20 percent of the average farm soybean yield.

From this point on, Tables 2 and 3 differ only in the yields and per-acre variable and fixed costs. The farm yields used in Tables 2 and 3 are the average of the county yields for crop reporting district 4 (central) and 9 (southeastern), respectively. Likewise, the average program yield for corn is the average of the 1987 county program yields for the respective crop reporting districts. The soybean yield used for calculating the drought payment is the average of the county yields, which in this case is the same as the farm yield. For a specific farm, however, the average farm yield will vary above or below the county average yield.

Looking at a specific example in Table 2 will give you a better idea of how the payments are calculated. Let's assume that the producer expects to harvest a corn crop that is reduced by 50 percent due to the drought and a soybean crop that is diminished by 30 percent. The third column illustrates a 50-percent corn crop and a 70-percent soybean crop. This producer would harvest 65 bushels of corn sold at an average price of $2.80 per bushel, equaling market returns of $182.00 per acre.

The first level of drought relief is forgiveness of any unearned advance deficiency payment that has already been received in the amount of $18.79 per acre. The actual cash drought payment occurs in tier 2. This payment is the difference between the 65-percent program yield level and the actual yield multiplied by the drought payment rate (79.30 - 65.00 = 14.30 x $1.90 = $27.17). Because the national average price of corn is below the target price, an $0.18 ($2.93 - $2.75 = $0.18) deficiency payment is earned. The deficiency payment is payable on those bushels for which the producer does not receive a drought payment. In this example, the payment is on the 65 bushels produced or $11.70 per acre.

It is assumed that this producer has already received a cash advance deficiency payment of $53.68 per acre. The producer may have to repay $6.29 of the cash advance by July 1989. This repayment is the advance deficiency payment rate multiplied by the bushels on which disaster payment were made ($0.44 x 14.30 = $6.29). Moreover, repayment of an additional $16.90 may be necessary. The $16.90 is the advance payment less the forgiveness in tier 1 of the drought payment, the earned deficiency payment, and the repayment on disaster bushels ($53.68 - $18.79 - $11.70 - $6.29 = $16.90). Cash receipts in 1988 will be $262.85 per acre. However, because $23.19 will have to be repayed, gross returns from the 1988 crop are $239.66 per acre. Subtracting the variable costs leaves net crop returns of $122.56 per acre.

A 70-percent soybean crop of 29.40 bushels sold at $8.00 per bushel results in gross crop returns of $235.20 per acre. No drought payments are earned for soybeans because the actual yield is greater than the 65-percent yield of 27.80 bushels.

With 45 percent of the acreage in corn, 44 percent in soybeans, and 11 percent set aside, the per-acre farm returns above variable costs from a 50-percent corn crop and a 70-percent soybean crop are $124.44. If fixed costs are $140.00 per acre, the returns above all costs are $-15.56 per acre.

Worksheet

A worksheet is provided in Table 4 for calculating per-acre drought payments and expected returns in 1988. The worksheet can be used for computing drought payments on any crop, program or nonprogram, as long as the appropriate prices and yields are used in lines 1 to 6. Program crops, such as corn and wheat, have an Agricultural Stabilization and Conservation Service (ASCS) program yield which should be entered in line 1. Nonprogram crop payments will be based on a county average yield. For program participants, the target price and advance deficiency rate should be entered in lines 4 and 5. For all nonparticipants and nonprogram crops, a value of 0 should be entered in these two lines. The drought payment base price can be obtained from the first column of Table 1 for the desired crop.

In the second section of the worksheet (lines 7 to 14), payment rates and yields are computed for use in section 3 in which per-acre returns and payments are estimated. In line 15, market returns are estimated by multiplying the actual yield by the market price for the commodity. The next three lines represent the three levels of drought payments. Drought relief payments will be received only if the actual yield is below the corresponding yield levels in lines 11 to 13. In the example, the actual yield is estimated at 46 bushels per acre. This yield is below the level 2 yield in line 12; therefore, drought payments are calculated for the first two tiers (lines 16 and 17). The payment in line 16 is not a cash payment but forgiveness of part of the advance deficiency payment which may not have been earned. Producers who know their per-acre variable and fixed costs can use section 4 to estimate returns above variable costs and returns above all costs.

Prepared by:

Robert H. Hornbaker
Extension Economist
Farm Management

Dale H. Lattz
Extension Economist
Farm Management

Issued by:

Robert H. Hornbaker

Table 4. Worksheet Estimating Per-Acre Returns Under the Disaster Relief Act of 1988

	Line	Item	Calculation	Example: corn	Farm 1	Farm 2
		Section 1. Yield and Price Information				
Line	1	ASCS program or county yield	Enter your figure	87.00	______	______
	2	Market price	Enter your figure	2.80	______	______
	3	National average price	Enter your figure	2.75	______	______
	4	Target price	Enter your figure	2.93	______	______
	5	Advance deficiency payment rate	Enter your figure	0.44	______	______
	6	Drought payment base price	Enter your figure	2.93	______	______
		Section 2. Calculate Payment Rates and Yields				
Line	7	Drought payment rates	line 6 x .65	1.90	______	______
	8		line 6 x .90	2.64	______	______
	9	Deficiency rate	line 4 - line 3 Min 0	0.18	______	______
	10	Advance deficiency payment	line 5 x line 1	38.28	______	______
	11	Yield tier 1, 100%	line 1 x 1.0	87.00	______	______
	12	Yield tier 2, 65%	line 1 x .65	56.55	______	______
	13	Yield tier 3, 25%	line 1 x .25	21.75	______	______
	14	Actual yield	Enter your figure	46.00	______	______
		Section 3. Disaster Payments and Cash Crop Returns				
Line	15	Market returns	line 2 x line 14	128.80	______	______
		Drought benefits[1]				
	16	Yield, 65-100%[2]	Min [5 x (1 - 14) or 5 x (1 - 12)]	13.40	______	______
		Cash payments				
	17	Yield, 25-65%	Min [7 x (12 - 14) or 7 x (12 - 13)]	20.05	______	______
	18	Yield, 0-25%	8 x (13 - 14)	0.00	______	______
	19	Cash receipts 1988	10 + 15 + 17 + 18	187.13	______	______
	20	Earned deficiency payment[3]	Min (9 x 1 or 9 x 14)	8.28	______	______
	21	Disaster deficiency repayment	Max [5 x (12 - 14), or 0]	4.64	______	______
	22	Normal deficiency repayment	Max [10 - (16 + 20 + 21)]	11.96	______	______
	23	Gross crop returns	19 - (21 + 22)	170.53	______	______
		Section 4. Returns Above Variable and Fixed Costs				
Line	24	Sunk variable costs	Enter your figure	95.00	______	______
	25	Variable harvest costs	Enter your figure	8.00	______	______
	26	Net crop returns	23 - (24 + 25)	67.53	______	______
	27	Fixed costs per acre	Enter your figure	90.00	______	______
	28	Returns above all costs	26 - 27	-22.47	______	______

[1]Drought payments occur only if the actual yield (line 14) is less than the corresponding yield levels in lines 11, 12, and 13.
[2]The first level of drought payment is the amount of advance deficiency payment, already received, which will not have to be returned.
[3]If line 9 is greater than line 5 and line 14 is less than line 1, the deficiency payment will be increased by: (9 - 5) x Min [1 - 14 or 1 - 12].

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-16 *October 1988*

Economics of Phosphorus and Potassium Applications

Annual application rates for phosphorus (P) and potassium (K) differ from rates for nitrogen. Nitrogen application rates are based upon the nutrient needs of the next crop to be grown. Phosphorus and potassium usually remain in the soil unless they are removed by a growing crop or by erosion.

Traditionally, Illinois fertilizer specialists recommend establishing a base soil test, then adding enough P and K fertilizer to support the yield of the most demanding crop and replace what that crop removes.

P and K fertilizer are usually inexpensive enough to justify investment in a 4-year buildup program. The yield response is very high at low P and K test levels but diminishes at higher test levels (Tables 1 and 2). Data for Tables 1 and 2 are taken from Figures 15 and 16 in the *1987-1988 Illinois Agronomy Handbook* (University of Illinois Cooperative Extension Service Circular 1266, pp. 53-54). These examples are for soils with low phosphorus-supplying power and high cation-exchange capacity (CEC), as depicted in Figures 13 and 14 in the Agronomy Handbook. Data for other soils in Illinois are included in the worksheets in Tables 3 and 4.

On low phosphorus-supplying soils, corn yield increased 7 percent as P_1 test levels increased from 30 to 40. However, from 60 to 70 P_1, the yield increase was only 1 percent. The average corn yield increase is enough to recover the amortized investment cost in 4 years or more, up to a 50 to 60 P_1 test level. Current prices for soybeans will also cover the costs of increasing the P_1 test level to 50. Even low prices for wheat will support increasing phosphorus levels to 60.

Similarly, in Table 2, with $2.75 corn, the value of the expected yield increase exceeds the 4-year amortization payment required on the initial potassium buildup, until 280 K is reached. For soybeans and wheat, K test levels are justified up to 240 and 160, respectively. The payoff period is more than 4 years for higher test levels of both P and K. Many producers face limits on borrowed funds available for production expenses. With limited working capital, producers should examine alternative levels of P and K.

Due to lower yields, crops will remove less P and K fertilizers in 1988 than in a year with normal yields. Generally, a field of corn which yields 50 percent of its normal level will remove 50 percent of the normal quantities of fertilizers. Let's assume that a producer who annually applies maintenance levels of fertilizer on a particular field harvests a corn crop with half its normal yield. For the 1989 crop, the producer can apply half the normal maintenance quantities of P and K and still maintain the soil test levels of 1988. Likewise, if none of the crop is removed from the field, the P and K test levels for 1989 should be the same as they were in 1988.

Worksheets

Tables 3 and 4 are worksheets for calculating your break-even test levels of P and K. Make one photocopy of the worksheets for each crop. To calculate break-even levels for different crops and soils, use the following procedures:

Line

1a Enter the crop you wish to evaluate (corn, soybeans, or small grains).
1b Enter the maximum yield for the selected crop on the selected field.
2a Enter the net price for the crop (market price less yield-related variable costs).
2b Enter the cost of the fertilizer.

3 Incremental changes in the test levels are provided.
4 This line provides the pounds of fertilizer required to change the test level by the amount indicated in line 3.
5 Multiply the price of fertilizer in line 2b by each level of application in line 4.
6 Multiply the dollar-per-acre value in line 5 by 0.315 to estimate the annual 4-year amortized cost, at 10 percent interest, of applying the fertilizer. Annual costs for other interest rates or amortization periods can be computed by replacing 0.315 with the appropriate amortization factor.
7a This section contains percentage yield-increase data by crop for low P-supplying soils or low CEC soils.
7b This section contains percentage yield-increase data by crop for high P-supplying soils or high CEC soils.
8 Calculate the bushel-per-acre increase in crop yield by multiplying the appropriate values for your soil type and crop in sections 7a or 7b by the potential crop yield in line 1b; then divide by 100.
9 Divide the values in line 6 by the cost of fertilizer in line 2b.
10 If the value in line 8 is greater than the value in line 9, you can justify a fertilizer buildup to the amount shown in line 10.

Summary

Optimum fertilizer rates are determined by equating the value of the increased yield of the crop to the cost of the additional fertilizers. When capital is limited, the return for each additional dollar invested in fertilizer must be equal to or greater than its potential return in alternative investments. A change in the ratio of commodity prices to fertilizer costs, with everything else held constant, changes the optimum levels of fertilizer.

The decision to apply P and K in any amount depends on the difference in yield responses and on alternative returns for the scarce operating dollars required for the fertilizer. If the producer can maintain yields with no additional P and K fertilizer, that option is more profitable in the short run.

Prepared by:

Robert H. Hornbaker
Extension Economist
Farm Management

Issued by:

Robert H. Hornbaker

Robert H. Hornbaker

Table 1. Economics of Phosphorus (P) Buildup in Low-Supplying Soils

	Change in P_1 test level			
	30 to 40	40 to 50	50 to 60	60 to 70
Buildup quantity of P_2O_5 required (lb/A)	90	90	90	90
Investment cost at $0.22/lb	$19.80	$19.80	$19.80	$19.80
	percent of potential			
Base yield of crop				
Corn	87	94	97	99
Soybeans	88	96	99	100
Small grains	56	71	85	92
Expected yield after buildup				
Corn	94	97	99	100
Soybeans	96	99	100	100
Small grains	71	85	92	95
Marginal increase in yields				
Corn	7	3	2	1
Soybeans	8	3	1	0
Small grains	15	14	7	3
Years to reach buildup level of yield	4	4	4	4
Average yield increase per acre	*bushels*			
Corn (150-bu potential)	10.5	4.5	3.0	1.5
Soybeans (50-bu potential)	4.0	1.5	0.5	0.0
Wheat (50-bu potential)	7.5	7.0	3.5	1.5
Annual 4-year amortized cost per acre of buildup fertilizer investment at 10-percent interest	$ 6.25	$ 6.25	$ 6.25	$ 6.25
Break-even increase in yield of crop	*bushels*[b]			
Corn at $3.50 (3.05)[a]	2.05	2.05	2.05	2.05
Corn at 2.75 (2.30)	2.71	2.71	2.71	2.71
Corn at 2.00 (1.55)	4.03	4.03	4.03	4.03
Soybeans at $8.25 (7.70)	0.81	0.81	0.81	0.81
Soybeans at 7.25 (6.70)	0.93	0.93	0.93	0.93
Soybeans at 6.25 (5.70)	1.10	1.10	1.10	1.10
Wheat at $4.25 (3.80)	1.64	1.64	1.64	1.64
Wheat at 3.50 (3.05)	2.05	2.05	2.05	2.05
Wheat at 2.75 (2.30)	2.71	2.71	2.71	2.71

[a]Net price equals market price less yield-related variable cash costs of maintenance fertilizer, harvesting, drying, storage, and marketing.
[b]The boxed area represents the test levels of phosphorus where the value of the increase in yield exceeds the 4-year amortized cost.

Table 2. Economics of Potassium (K) Buildup in High CEC Soils

	Change in K test level				
	120 to 160	160 to 200	200 to 240	240 to 280	280 to 320
Buildup quantity of K_2O required (lb/A)	160	160	160	160	160
Investment cost at $0.125/lb	$20.00	$20.00	$20.00	$20.00	$20.00
	percent of potential				
Base yield of crop					
Corn	77	85	92	95	97
Soybeans	81	88	95	97	98
Small grains	92	96	98	99	100
Expected yield after buildup					
Corn	85	92	95	97	98
Soybeans	88	95	97	98	99
Small grains	96	98	99	100	100
Marginal increase in yield					
Corn	8	7	3	2	1
Soybeans	7	7	2	1	1
Small grains	4	2	1	1	0
Years to reach buildup level of yield	4	4	4	4	4
Average yield increase per acre	*bushels*				
Corn (150-bu potential)	12.0	10.5	4.5	3.0	1.5
Soybeans (50-bu potential)	3.5	3.5	1.0	0.5	0.5
Wheat (50-bu potential)	2.0	1.0	0.5	0.5	0.0
Annual 4-year amortized cost per acre of buildup fertilizer investment at 10-percent interest	$ 6.31	$ 6.31	$ 6.31	$ 6.31	$ 6.31
Break-even increase in yield of crop	*bushels*[b]				
Corn at $3.50 (3.05)[a]	2.07	2.07	2.07	2.07	2.07
2.75 (2.30)	2.74	2.74	2.74	2.74	2.74
2.00 (1.55)	4.07	4.07	4.07	4.07	4.07
Soybeans at $8.25 (7.70)	0.82	0.82	0.82	0.82	0.82
7.25 (6.70)	0.94	0.94	0.94	0.94	0.94
6.25 (5.70)	1.11	1.11	1.11	1.11	1.11
Wheat at $4.25 (3.80)	1.66	1.66	1.66	1.66	1.66
3.50 (3.05)	2.00	2.00	2.00	2.00	2.00
2.75 (2.30)	2.74	2.74	2.74	2.74	2.74

[a]Net price equals market price less yield-related variable cash costs of maintenance fertilizer, harvesting, drying, storage, and marketing.
[b]The boxed area represents the test levels of potassium where the value of the increase in yield exceeds the 4-year amortized cost.

Table 3. Worksheet for Phosphorus

1a	Crop ______	1b	Potential yield (bu/A) ______		
2a	Net market price ($/bu) ______	2b	Price of P_2O_5 ($/lb) ______		
		Change in P_1 test level			
3		30 to 40	40 to 50	50 to 60	60 to 70
4	Buildup quantity of P_2O_5 required (lb/A)	90	90	90	90
5	Investment cost (multiply line 2b by line 4)	____	____	____	____
6	Annual 4-year cost at 10-percent interest (line 5 x 0.315)	____	____	____	____
	Marginal increase in yields	*percent of potential*			
7a	Low P-supplying soils				
	Corn	7	3	2	1
	Soybeans	8	3	1	0
	Small grains	15	14	7	3
7b	High P-supplying soils				
	Corn	3	2	1	0
	Soybeans	3	1	0	0
	Small grains	14	7	3	1
8	Yield increase (line 1b x values in 7a or 7b ÷ 100)	____	____	____	____
9	Break-even increase in yield (line 6 ÷ 2b)	____	____	____	____
		lb/A			
10	If line 8 is greater than line 9, build up P_1 test to:	40	50	60	70

Table 4. Worksheet for Potassium

1a	Crop ______	1b	Potential yield (bu/A) ______			
2a	Net market price ($/bu) ______	2b	Price of K_2O ($/lb) ______			
		Change in K test level				
3		120 to 160	160 to 200	200 to 240	240 to 280	280 to 320
4	Buildup quantity of K_2O required (lb/A)	160	160	160	160	160
5	Investment cost (line 2b x line 4)	____	____	____	____	____
6	Annual 4-year cost at 10-percent interest (line 5 x 0.315)	____	____	____	____	____
	Marginal increase in yields	*percent of potential*				
7a	Low CEC soils					
	Corn	7	3	2	1	0
	Soybeans	7	2	1	1	0
	Small grains	2	1	1	0	0
7b	High CEC soils					
	Corn	8	7	3	2	1
	Soybeans	7	7	2	1	1
	Small grains	4	2	1	1	0
8	Yield increase (line 1b x values in 7a or 7b ÷ 100)	____	____	____	____	____
9	Break-even increase in yield (line 6 ÷ 2a)	____	____	____	____	____
		lb/A				
10	If line 8 is greater than line 9, build up K test to:	160	200	240	280	320

Cooperative Extension Service
United States Department of Agricilture
University of Illinois
At Urbana-Champaign
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-17 *October 1988*

Expense Sharing on Crop Leases and Changes in Cash Rent

Crop-share Leases

Because the landowner with a crop-share lease receives a share of the gross returns, the landowner's gross income goes up and down in the same proportion as the farmer-tenant's gross income. Many of the production expenses are shared by the tenant and the landowner. Each has his or her own fixed costs. Tenants have labor and machinery investment and depreciation. Landowners have real estate taxes and may or may not have mortgage payments to make; in any case, they also expect a return on their investment in land and buildings. Thus, in the case of the crop- share lease, both parties share the risk. They are in the same boat and have to weather the storms together.

There likely will not be any clamor for adjustment in the crop-share lease due to the drought, unless it is on the cost-sharing side. We have just completed analysis of a survey--conducted through the county Cooperative Extension Service office--on leasing practices during the past year in counties in central Illinois (generally, the area north of I-70, east and south of the Illinois River, and bounded on the east by the Illinois-Indiana border). The crop-share lease on the output side is almost universally 50-50 between the farmer and the landowner. On the cost side, this survey shows that virtually all leases share the seed, herbicide, and annual fertilizer 50-50 or the same as the crop is shared. About 78 percent share the limestone and its application 50-50. Landowners pay for all the limestone on the remaining 20 percent or so of the leases. Over half the tenants pay for application of the other fertilizers. Only about 20 percent of the landowners share in the cost of combining; that is, on 80 percent of the leases the tenants pay all the harvesting expenses, but drying is split 50-50. Eighty-three percent of the tenants haul all the grain to the nearest market.

However, a significant number of tenants--69 percent--thought their leases were unfair to them. Only 31 percent of the tenants thought their leases were equitable or favorable to them. This shows significant discontent in the expense split. Up until the mid-1970s, most landowners split the harvesting costs 50-50. Many tenants started paying all the harvesting costs when there were high profits in farming (from 1973 to 1981) in order to keep their leases or rent more land. With lower returns in recent years and expenses creeping upward, some tenants believe that landowners should share more on the operating expense side of the crop-share lease. Greater sharing in application costs of fertilizer and herbicides would be another way landowners could share in expenses; still another way would be to pay for all the limestone as most landowners used to do.

Cash-rent Leases

There are several types of cash-rent leases; some are self-adjusting in case of a drought. The Cooperative Extension Service has recommended variable-type cash-rent leases for many years, including disaster clauses that would handle a drought situation. However, most cash-rent leases, according to our surveys, continue to be fixed cash rent on an annual basis. The fixed cash-rent lease shifts all the risk (as well as the potential for gain) to the tenant. A poor crop hurts the tenant, and a good crop with average or better prices benefits the tenant. The landowner gets the same rent in any case.

In some cases, fixed cash rents were renegotiated downward in 1983 when some areas had poor crops. The landowner is not obligated to do that, and the tenant is not obligated under a fixed cash-rent lease to pay more in a really good year. The fixed rent should be negotiated by the landowner and tenant to reflect average returns and risks. Changes in fixed rent in disaster situations depend on the personal relationship and financial ability of the two parties involved. At this point in time, corn and beans are being harvested and prices are known from the market. Government drought payments may still be unknown, but they will likely be less than deficiency payments would have been with a good crop. Thus, it is time to get specific about any renegotiation of current cash rent paid or due in 1988. This will have to be done on a case-by-case basis.

It is not too early to start thinking about negotiating a variable cash-rent lease for the future. Variable cash rent would change both up and down, depending on yield and price levels. One recommended variable cash-rent formula was given in Farm Economics Facts and Opinions 83:20, September 1983:

$$\text{Cash rent} = \text{bushels agreed to in the lease} \times \frac{\text{yield this year}}{\text{base yield}} \times \text{price of grain this year}$$

The number of bushels agreed to by the owner and farmer is negotiated and normally ranges from 25 to 40 percent of the normal expected yield for the farm. The lower quality land is at the lower end of this percentage range, and the higher end of the range is found only on the very best quality land that may have added benefits such as good road access and a good usable set of farm buildings.

Specific disaster clauses can also be used in a fixed cash-rent lease. In these clauses, there is usually a threshold point where a reduction in rent is granted if yields fall below a certain percentage of a stipulated yield level (such as 70 to 80 percent of the ASCS yield). If a disaster clause is included, a bonus clause should also be included for the benefit of the landowner. The bonus clause is usually the mirror image of the disaster clause so that the bonus will apply when yields go above 120 to 130 percent of the ASCS yield for the farm.

Another method for calculating a variable cash rent and suggested disaster and bonus clauses for fixed cash-rent leases follows.

Complete variable cash-rent formula

$$\text{Rent}^1 = \text{percent in soybeans} \times \frac{\text{current soybean yield}}{\text{5-yr.-ave. soybean yield}} \times \frac{\text{current soybean price}}{\text{5-yr.-ave. soybean price}} = \_\_\_\_\_\_$$

$$\text{Rent}^1 = \text{percent in corn}^2 \times \frac{\text{current corn yield}}{\text{5-yr.-ave. corn yield}} \times \frac{\text{current corn price}^3}{\text{5-yr.-ave. corn price}} = \_\_\_\_\_\_$$

$$\text{adjusted rent per acre} = \_\_\_\_\_\_$$

[1]Rent per acre agreed to at the beginning of the lease period.
[2]Actual corn acreage plus any set-aside acreage above the required amount.
[3]The target price or the market price, whichever is greater, with the 5-year average figured in the same way.

Suggested disaster clause

If yields, due to natural disaster that normally cannot be insured against, fall below _______ percent of the following stipulated yield (corn ____ bushels/acre; soybeans ______ bushels/acre; wheat _____ bushels/acre; oats _____ bushels/acre), then a reduction in rent will be calculated based on the foregoing complete variable cash-rent formula.

Such reduction will be deducted from the final cash-rent payment due the landowner. If the reduction exceeds the final payment due the landowner, the landowner shall refund to the tenant the excess already paid within 30 days following the last scheduled cash-rent payment date or when the foregoing calculation is determined.

Suggested bonus clause

If yields, due to an unusually good year, exceed _____ percent of the foregoing stipulated yields, then the farm operator shall pay the landowner additional rent as calculated under the complete variable cash-rent formula. This payment shall be part of the final cash-rent payment and shall be made no later than __(date)__.

Prepared by:

John T. Scott, Jr.
Extension Economist
Land Economics and Farm Management

Issued by:

John T. Scott Jr.

John T. Scott, Jr.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-18 *November 1988*

Economics of Nitrogen Fertilizer

The economic choices regarding fertilizer involve evaluating the trade-offs among crop choices, the amount of fertilizer to apply, the reasons for applying it, and alternative uses of limited funds for production expenses. To make economic choices, it is important to recognize the relevant costs to consider.

The economic rules for determining the quantity of nitrogen (N) fertilizer to apply are very simple. The first rule is that the value of added product must be equal to or greater than the cost of the added fertilizer (marginal revenue greater than marginal cost). The second rule is that because capital may be limited, the marginal return of the last dollar increment of fertilizer must be equal to or greater than its return in other uses (equal marginal return or opportunity cost).

Evaluating Optimum Nitrogen Fertilization Rates

The basic information needed for determining the most profitable nitrogen fertilization rate is the physical production function or the relation of crop yields to varying rates of fertilizer application. By using output and input prices, the most profitable application rate can be determined. The data in Table 1 show the net returns from various rates of nitrogen fertilization on continuous corn when the price of corn is \$2.00 per bushel, the cost of nitrogen is \$0.16 per pound, and the other direct costs related to yield are \$0.45 per bushel harvested.

Applying nitrogen at a rate of 190 pounds per acre produces the maximum return of \$240.75 per acre. Applying 10 pounds less decreases net returns by \$0.33. The last 10 pounds applied gives an added return of \$2.42 at an added cost of \$2.10. The net return over variable cost per dollar of nitrogen spent is \$0.21. If the \$2.10 spent on the last 10 pounds of nitrogen could return more than \$2.42 in another use, then the total farm returns could be maximized by stopping at the 180-pound application level.

The optimum level of nitrogen use depends upon the technical relation of crop yield and units of nitrogen applied, the price of the product, the cost of nitrogen, and other direct costs related to yield. The data in Table 2 are derived from the response curve used in Table 1. As the price of corn increases, the rate of nitrogen application should increase. On the other hand, when the cost of the nitrogen fertilizer increases, fewer pounds of nitrogen should be applied. The amount of the reduction depends upon the response function and the magnitude of the changes in prices. For example, Table 2 shows that a decrease in the corn price from \$3.00 to \$2.00 and a doubling of the nitrogen price from \$0.10 cents to \$0.20 cents would result in a 30-pound or 14-percent reduction in the optimum application rate.

The optimum rates calculated in Table 2 are averages over 4 years. Depending upon moisture conditions and other environmental factors, the optimum rate may vary from year to year. There is a penalty of lost return when an application less than the optimum amount is applied. The penalty for applying more than the optimum amount is the cost of the extra fertilizer plus any loss of yield if production begins to diminish.

Overshooting the optimal fertilizer rate violates rule one of economic choice: the relation of marginal cost and marginal return. Producers who have limited financial resources should also be applying rule two: equal marginal returns. That is, they should be comparing the marginal return

Table 1. Returns from Nitrogen (N) Fertilization on Corn

N applied (lb/A)	Yield (bu/A)	Marginal increase (bu/A)	Value of marginal increase @ $2.20	Cost of added N plus other direct costs[a]	Total returns over N and other direct costs	Average net return per $ of N	Marginal net return per $ of N
100	135.1	...	...	...	...	...	...
110	138.4	3.31	7.29	3.09	224.57	12.76	2.62
120	141.4	3.04	6.68	2.97	228.29	11.89	2.32
130	144.2	2.76	6.07	2.84	231.52	11.13	2.02
140	146.7	2.48	5.47	2.72	234.27	10.46	1.72
150	148.9	2.21	4.86	2.59	236.53	9.86	1.41
160	150.8	1.93	4.25	2.47	238.31	9.31	1.11
170	152.5	1.65	3.64	2.34	239.61	8.81	0.81
180	153.8	1.38	3.03	2.22	240.42	8.35	0.51
190	154.9	1.10	2.42	2.10	240.75	7.92	0.21
200	155.8	0.83	1.82	1.97	240.59	7.52	-0.10
210	156.3	0.55	1.21	1.85	239.95	7.14	-0.40
220	156.6	0.27	0.60	1.72	238.83	6.78	-0.70
230	156.6	0.00	-0.01	1.60	237.22	6.45	-1.00
240	156.3	-0.28	-0.62	1.47	235.13	6.12	-1.31

[a]N at $0.16 per pound and other direct costs at $0.45 per bushel.

Table 2. Optimum Rate of Nitrogen (N) on Corn

Corn price ($/bu)	Price of nitrogen 10¢/lb	16¢/lb	20¢/lb
	--------*pounds of N per acre*-------		
$2.00	197	188	178
2.50	204	197	190
3.00	208	202	196

of the last dollar invested in fertilizer with that dollar's return in seed, pesticide or machinery cost, or other uses.

Target yields are useful to producers only if an appropriate target is used for the particular region of the state and soil type. The average potential yield for a given region can be estimated as the average maximum yield over a 4- to 10-year period. An example of 4- to 5-year estimates for DeKalb, Carthage, and Toledo, Illinois, in the late 1960s is given in Table 3.

The amount of nitrogen (as a ratio) that should be applied for maximizing yield is 1.22, 1.27, and 1.36 times the potential yield at DeKalb, Carthage, and Toledo, respectively. The last two lines of Table 3 show the ratio of nitrogen fertilizer to the potential yield for maximizing net returns for corn prices of $3.00 and $2.00. For the DeKalb example, the nitrogen application rate, which maximizes net returns given an expected corn price of $2.00 per bushel, is 147 pounds (1.07 x 137.3).

Perhaps as important as determining the rate of nitrogen application is the effective use of nitrogen for producers short of capital. Later applications of fertilizer, allowing for fewer losses from denitrification, may be an effective way to reduce costs rather than reducing the amounts applied. This may be particularly true for the 1989 season because any nitrogen left over from 1988 will depend on the amount of rainfall from now until next spring.

Summary

Optimum fertilizer rates are determined by equating the value of the increased yield of the crop to the cost of the additional fertilizers. In addition, when capital is limited the return for each additional dollar invested in fertilizer must be equal to or greater than its return in other investments. Therefore, a reduction in the ratio of commodity prices to fertilizer costs, with everything else held constant, leads to lower optimum levels of fertilizer.

Table 3. Average Ratios of the Optimum Nitrogen Application Rate to Potential or Maximum Yield[a]

	DeKalb	Carthage	Toledo
Average Potential Yield[b]	137.3	147.7	120.8
Maximum Yield Ratio[c]	1.22	1.27	1.36
Optimum Yield Ratio[c]			
at $3.00 per bushel	1.13	1.20	1.23
at $2.00 per bushel	1.07	1.16	1.16

[a]N at $0.16 per pound and other direct costs at $0.45 per bushel.
[b]The average maximum yield for an estimated response curve.
[c]The ratio of nitrogen fertilizer to the average maximum yield.

Prepared by:

Robert H. Hornbaker
Extension Specialist
Farm Management

Issued by:

Robert H. Hornbaker

CORRECTION to *Farm Economics Facts and Opinion* 88:16: Line 9 in the directions for the worksheet should have read, "Divide the values in line 6 by the net market price in line 2a." Also, correct line 9 in Table 3 to read "Break-even increase in yield (line 6÷2a)."

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 88-19 *December 1988*

Drought Increases the Importance of Income Tax Planning for Farmers

Income tax planning is normally considered an exercise that a farmer goes through late in the tax year to carefully assess the likely impact of taxes on his or her business. Good tax management should be a year-round process because so many transactions can have substantial tax consequences. Late in December, more than 2 or 3 weeks may be required to make the necessary adjustments that will result in a good tax plan.

Good tax planning through the remainder of 1988 will be important in helping to minimize your income tax liability. For many farm operators, especially those in areas where this summer's drought reduced yields substantially, taxable incomes in 1989 may be considerably lower than in 1988. Taxable incomes in 1988 may be relatively high compared to recent years mainly because large inventories of the 1987 crop were carried over and sold in 1988. Some of this grain may have been sold for a relatively good price as prices increased in early summer. Depreciation on farm equipment continues to decline as machinery is not being replaced very rapidly. Decreased inventories of grain carried into 1989, along with increased operating expenses next year due to less set-aside acres and more acres planted to corn and soybeans, may result in lower incomes in 1989. Livestock producers can expect livestock prices in 1989 to be lower and feed costs to be higher than in recent years.

The basis for tax planning is an accurate and comprehensive set of farm business records. For most sole proprietors, this should include business transactions as well as personal expenditures that might qualify for itemized deductions. More farmers are moving towards a procedure of reconciling all funds flowing through their accounts in order to verify mathematically that no items have been omitted or duplicated.

In addition to summarizing year-to-date data for 1988, awareness of the tax treatment of disaster payments, multiperil crop insurance proceeds, and forced sales of livestock due to drought conditions are important. Our procedures here will focus primarily on the cash-basis farmer, but most of the consideration of alternatives will apply to the accrual-basis person as well.

The goal of tax planning is to minimize the amount of income tax that has to be paid over time. This is normally accomplished by leveling the taxable income to avoid the wide fluctuations that might cause you to be pushed into the higher tax brackets. Because of the magnitude of the self-employment tax rates, planning may occasionally take another route. The Tax Reform Act of 1986 has widened the interval from one rate to the next so that you may not have to be quite as precise in planning in order to avoid higher tax rates.

The first step, as suggested above, is to post all transactions to date in your farm record books; then run totals on all of the accounts. Record these totals on a tax worksheet or on a blank copy of last year's schedule F and/or form 4797. Many tax worksheets are designed with three columns: year to date, projections and/or adjustments, and a total.

A sample income-tax projection worksheet from North Central Regional Publication No. 2, *Income Tax Management for Farmers*, follows.

Next, list all income that you will be receiving before the end of the year and all expenses that must be paid by the end of the year. Then list income that may be received this year or carried over into next year, and list expenses that can be paid by the end of the year but are not due until the following year. This will give you an idea of your projected income for the year and the extent to which you can adjust that projection.

Last year's depreciation may guide you in making an estimate for this year. Because so many items have reached the end of their depreciable life under the Accelerated Cost Recovery System (ACRS), it would be best to review last year's schedule rather thoroughly. The depreciation on current year purchases should be included in your estimate. Some computer programs are capable of calculating next year's depreciation for items currently on the schedule.

A review of the previous year's tax return is the normal starting point for an evaluation and relative comparison of the current year's income level. It is only a guide, however, because estimates for the current year and the forthcoming year can still be changed.

Several figures might help determine both the gross income and the net income levels you want to attain. Many grain farmers carry a substantial portion of the crop over into the next calendar year. When this year's gross income to date has been calculated, compare it with a projection of what next year's sales may be, based on the current inventory. If price uncertainty is associated with next year's sales, plan on letting next year's gross run at least 5 percent higher than this year's.

If parts of two crops are sold in one year, it is a little more difficult to identify the gross income you want to report. It probably should approximate an annual projected gross income for the farm.

For those individuals who have an accrual-basis income statement, the previous year's accrual net income may serve as a guideline for the current year's cash-basis income. Projecting from such a figure should help to bring you close to the net income that you would achieve with good tax planning. In gathering data for a comparison with last year, make sure that any significant nonfarm data is also included in your analysis.

Crop insurance payments and disaster payments are normally included in income for the year payment is received. However, if you are using the cash method of accounting, you may elect to postpone reporting these payments until the following year. There was some uncertainty as to whether the disaster payments received in 1988 under the Disaster Relief Act would qualify as payments that could be postponed. This concern was alleviated by a provision in the Technical and Miscellaneous Revenue Act of 1988 (TAMRA) that allows postponement in reporting these payments.

To make the election to postpone reporting disaster payments and crop insurance proceeds, you must be able to show that the income from the damaged crops would have been reported in any tax year following the year the damage occurred.

To make this election, attach a statement to your return for the year the damage took place. The statement must include your name, address, and the following information.

1. a statement that you are making the election under section 451(d) of the Internal Revenue Code and sections 1.451-6 of the regulations

2. what crop or crops were destroyed

3. a statement that under your normal business practice you would have included the income derived from the damaged or destroyed crops for a tax year following the tax year of destruction

4. the cause and date of damage

5. an itemized account of the insurance payment received along with the date it was received

6. the name of the insurance carrier from whom you received the payments

You may elect to postpone--for one year--reporting the sale of livestock, if the sale was due to drought conditions. The sales proceeds that may be postponed are only from the animals that are sold in addition to animals that would be sold during the normal course of business. In addition, the following conditions must be met.

1. Your principal business is farming.

2. You use the cash method of accounting.

3. You can show that the sale would have not occurred under your usual business practices except for the drought.

4. The drought has resulted in an area being designated as eligible for assistance by the federal government.

The Federal Income Tax Projection Worksheet

Use this worksheet throughout the year in planning farm business and tax management strategies. If you do not use it throughout the year, use it in November to plan tax savings in December.

	Amount to Date	Estimated Rest of Year	Estimated Year's Total
FARM RECEIPTS:			
Sales of product raised[a] and miscellaneous receipts:			
Cattle, hogs, sheep and wool, etc.	$____	____	____
Poultry, eggs and dairy products	$____	____	____
All crop sales	$____	____	____
Custom work, prorations and refunds agriculture program payments	$____	____	____
Total sales and other farm income ... (1)	$____	____	____
Sales of purchased market livestock[b]	$____	____	____
Purchase cost (subtract)[c]	$____	____	____
Gross profits on sale of purchased livestock ... (2)	$____	____	____
Gross farm profits (Item 1 + 2) ... (3)	$____	____	____

FARM EXPENSES:

Breeding fees	$____	Pension, profit sharing	$____
Chemicals	$____	Rent of farm, pasture	$____
Conservation expenses	$____	Repairs, maintenance	$____
Custom hire (machine work)	$____	Seeds, plants pruchased	$____
Employee benefit programs	$____	Storage, warehousing	$____
Feed Purchased	$____	Supplies purchased	$____
Fertilizers and lime	$____	Taxes	$____
Freight, trucking	$____	Utilities	$____
Gasoline, fuel oil	$____	Veterinary Feeds	$____
Insurance	$____	Other	$____
Labor hired	$____	Other	$____

	Amount to Date	Estimated Rest of Year	Estimated Year's Total
Total cash farm expenses ... (4)	$____	____	____
Depreciation on machinery improvements, dairy and breeding stock ... (5)	$____	____	____
Total deductions (Item 4 + 5) ... (6)	$____	____	____
Self employment farm income (Item 3 less item 6) ... (7)	$____	____	____
OTHER INCOME:			
Net taxable gain from Schedule D (Sales of dairy and breeding stock, machinery and other capital exchanges ... (8)	$____	____	____
Taxable non-farm income ... (9)	$____	____	____
Adjusted gross income (Item 7 + 8 + 9) ... (10)	$____	____	____
Less: standard deduction or itemized deductions[d]	$____	____	____
$1,950 × ____ personal exemptions[e]	$____	____	____
Total non-business deductions and exemptions ... (11)	$____	____	____
Taxable income (Item 10 less item 11) ... (12)	$____	____	____
Estimated income tax (calculated from applicable tax computation table or rates) ... (13)	$____	____	____
Estimated self-employment tax (Item 7 × .1302)[f] ... (14)	$____	____	____
TOTAL TAX (Item 13 + 14) ... (15)	$____	____	____
Less Credits: allowable investment credit and carryover, gas tax, income tax withheld and estimated tax paid ... (16)	$____	____	____
Estimated tax due (Item 15 less item 16) ... (17)	$____	____	____

Last year's marginal tax bracket ____ %

This year's estimated marginal tax bracket ____ %

Next year's expected marginal tax bracket ____ %

[a] For accural method include sales of all livestock.

[b] Omit for accrual method.

[c] For accrual method adjust for change in inventory and new livestock purchases.

[d] Use itemized deductions if larger.

[e] Exemption for 1988, see current tax regulation for subsequent years.

[f] Rate for 1988, see current tax regulation for subsequent years.

Although most producers are concerned about ways to lower income before the end of the year, there may be certain instances in which net income needs to be increased before the end of the year. Low crop yields the previous year, a change in the farm lease from a crop share to cash rent, or farming of increased acreage are some reasons that farm income may be low for a given year. At the minimum, net farm and nonfarm income should be high enough to cover the taxpayer's standard deductions and personal exemptions. Some ways to increase income include selling some new crop grain and collecting before year end, and delaying payment of those expenses that are not required to be paid until after the first of the year.

Farmers looking for ways to lower their income before the end of the year may defer reporting income from fall grain sales by signing a delayed payment contract with their elevator when the grain is sold. These contracts state that proceeds from the grain sale cannot be collected until after the first of the year.

Another way to lower the current year's income is to prepay next year's farm-operating expenses. When doing this, be sure your purchase invoice states the quantity and price of the supplies. Just making a down payment toward next year's bills is not acceptable. There also should be an economic reason for prepaying expenses, such as receiving a cash discount for paying ahead. Some of the more common expenses that are prepaid include fertilizer, seed, feed, and chemicals. Also, you may want to pay up any accrued interest or drying and storing charges. Prepayments of interest, cash rent, or insurance are not deductible. When prepaying expenses, be sure to pay those that yield the largest economic return first, that is, those that have the largest cash discount and those that will need to be paid soon after the first of the year.

Producers who have purchased machinery or equipment during the year may elect to deduct those purchases in the current year instead of setting them up on depreciation. Producers can deduct up to $10,000 of eligible capital purchases. If few capital purchases have been made this year and no more are planned, the prepayment of cash-operating expenses should normally carry a higher priority for added deductions than machinery and equipment purchases.

Another method used to lower income is contributing to an IRA, Keogh plan, or both. Contributions to these plans generally reduce gross income. The Tax Reform Act of 1986, however, has placed some limitations on the deductibility of IRA contributions. It should be noted that although contributions can be made to Keogh plans up to the due date of the tax return, the plan must be established by the end of the tax year to allow a deduction for those contributions.

Changes in tax laws and relatively better incomes have increased the importance of tax planning for farm operators. The key to tax planning is to start now to allow time for adjustments to be made before the end of the year.

Prepared by:

Charles Cagley
Agricultural Economist

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-1 *January 1989*

Crop Production and Marketing Plans for 1989

Although you may have already taken steps to carry out your long-run crop plans, it could be profitable to take a careful look at prices, costs, and the provisions for participation in the feed-grain and wheat programs for 1989 to see whether any changes should be made in your 1989 cropping program.

1989 Program Provisions for Feedgrains and Wheat

Target prices and loan prices

For 1989 crops, the target prices will be $2.84 per bushel for corn and $4.10 per bushel for wheat. The announced loan rates will be $1.65 per bushel for corn and $2.10 per bushel for wheat.

Deficiency payments

Rates will be calculated as the difference between the target price of a commodity and either the average price farmers receive for the commodity during the 1989 grain marketing year or the announced loan rate, whichever is higher. This rate of payment will apply to the effective yield production on program acres planted. An advance of 40 percent of the estimated deficiency payment may be requested by the producer at the time he enrolls in the program. All the advance payments will be paid in cash this year soon after sign-up. Subsequent payments earned will be paid after the first 5 months of the marketing year with the final payment made at the end of the marketing year.

Maintenance of crop bases

At sign-up, participating producers may declare their intentions to plant from 10 to 25 percent of each crop's permitted acreage to soybeans or sunflowers while protecting their crop's acreage base history. Reductions in these planting intentions may be made if the Secretary of Agriculture establishes that the proposed production increase would result in a price below $5.49 for the 1989 crop of soybeans (115 percent of the $4.77 loan rate for the 1988 crop). As in previous years, eligible other nonprogram crops (ONPC) and conserving use crops raised may be used to protect program crop bases. Participants must plant at least 50 percent of their permitted program crop base in order to use

Table 1. Program Provisions and Payment Rates, 1989

	Corn	Sorghum	Barley	Oats	Wheat
Required acreage reduction (% of base)	10.0	10.0	10.0	5.0	10.0
Maximum permitted acreage (% of base)	90.0	90.0	90.0	95.0	90.0
Target price	$2.84	$2.70	$2.43	$1.50	$4.10
Basic loan rate	2.06	1.96	1.68	1.06	2.57
Adjusted 9-month loan rate	1.65	1.57	1.34	0.85	2.06
Maximum deficiency payment rate	1.19	1.13	1.09	0.65	2.04
Deficiency subject to payment limitation	0.78	0.74	0.75	0.44	1.53
Projected deficiency payment rate	0.89	0.90	0.23	0	0.50
Advance deficiency rate	0.356	0.36	0.092	0	0.20

ONPC acres for this purpose. In 1989, this acreage is limited to 20 percent of permitted acres. There is no limit on conservation-use acres.

0-92 optional acreage diversion

Participating wheat and feedgrain producers may elect to plant less than their permitted acreages, all the way down to none at all, and receive the assured projected deficiency payments on 92 percent of the permitted acres. The projected payment rates are $0.89 for corn and $0.50 for wheat. The schedule for issuing these payments is the same as for the regular deficiency payments. Land idled must be in a soil-conserving use. No harvesting of any crops will be permitted. Only under a drought emergency will grazing be allowed in the designated 5-month nongrazing period during the 7 months, April 1 through October 31.

Acreage and yield bases

The acreage base for determining acreage reduction and payments for 1989 feedgrain and wheat crops for any given farmer is the farmer's yearly average number of acres planted, or considered planted, in the 5 years from 1984 to 1988. In the case of feedgrains, corn and sorghum bases are combined for program benefits, as in previous years, but barley and oat bases are not. The yield base is the same as for 1988 crops--that is, the yearly average effective program yield for the years 1981 through 1985, with the highest and lowest yields dropped.

Reduced set-aside acreage requirements

To be eligible for target price deficiency payments and commodity price support loans for corn, grain sorghum, and barley, you must reduce acres planted for harvest by 10 percent. Oats require only a 5 percent reduction. The wheat program participants must also reduce acreage by 10 percent in order to be eligible for benefits. There is no paid land diversion for either wheat or feedgrains in 1989.

The eligibility requirements for land to be set aside and for the cover crops to meet program requirements are the same as those for programs prior to 1989. No harvesting of set-aside acres for forage use will be permitted in 1989, except in the case of an area drought emergency such as that experienced in 1988. Grazing of all set-aside conserving use acres will be permitted before and after the 5-month nongrazing period designated for Illinois by the state ASCS committee.

Cross compliance

Limited cross compliance is required for participation in all of the 1989 acreage reduction programs except oats. Limited compliance means that to qualify for program benefits of one commodity, the producer must restrict plantings of all other program crops to the base acres for those crops on that farm. Offsetting compliance between farms is not required.

Payment eligibility and payment limitation

New payment limit regulations require all program participants to be certified by the county ASCS committee as "actively engaged in farming" and eligible for program benefits before receiving any payments from 1989 programs. Forms for recording data to prove that you are actively engaged in farming and eligible for program benefits are available at your county ASCS office.

Deficiency and diversion payments will be limited to a total of $50,000 per person for all participating program crops. A person may participate in three business entities for payment. The portion of the deficiency payments derived from cuts in the announced loan rates below the basic loan rates of $2.06 for corn and $2.57 for wheat is not subject to the $50,000 limit. Thus, only $0.78 of the deficiency payment for corn and $1.53 for wheat will be subject to the payment limitation. This is $0.06 more than the target price deficiency payment rates of $0.72 and $1.47 subject to limitation made for the respective 1988 crops.

In addition to commodity payments subject to the $50,000 limit, payments not subject to the $50,000 limit (that is, deficiencies issued due to the reduced loan rate), gains on marketing loan redemptions other than PIK redemptions, and total honey loans outstanding, in combination, cannot exceed the overall $250,000 limit. Conservation reserve participants have a separate $50,000 lid, and these payments are not included in the overall $250,000 limit.

Penalty

Producers who sign up for participation and fail to comply with program requirements will be subject to a liquidated damages penalty. This penalty is program production multiplied by 20 percent of the commodity target price. In addition, advance payments must be repaid with interest.

Sign-up dates

Wheat and feedgrain program sign-up will begin December 19, 1988, and continue through April 14, 1989. Producers must declare their intention to grow from 10 to 25 percent of each program crop's permitted acreage in soybeans or sunflowers by February 3, 1989.

Comparing crop alternatives

To help you select crop combinations that will optimize net crop returns, the contributions of individual crops at varying yields and prices are presented in Table 2. An itemization of the costs of producing different crops is presented in Table 3. The "net return over variable cost" column in Table 2 indicates the marginal effects of acreage shifts on crop income. For instance, comparison of the net return of $159.50 over variable costs from a 135-bushel corn crop sold at harvest for $2.20 per bushel with a net return of $219.50 for a 45-bushel soybean crop sold at harvest for $6.50 per bushel suggests that you might profitably shift some acres from corn to soybeans if you are not participating in the reduced acreage program for corn.

Soybeans compete well with crops grown under 1989 commodity programs. At the harvest delivery prices currently being offered to producers ($2.20 per bushel for corn and $6.50 per bushel for soybeans), a composite, 135-bushel-yield, corn-base acre under participation in the feedgrain program gives a net return of $206. The return from an acre of 45-bushel soybeans is $220. The return from participation in a wheat program with a 54-bushel yield is $122 per acre, and the return for a 30-bushel soybean crop is $130 per acre.

Similarly, in evaluating possible participation in 1989 program alternatives for corn, you should compare the expected net returns from producing one acre of corn if you don't participate with the net returns from the composite corn-acre base of 0.9 acre devoted to corn production and 0.1 acre set-aside. Then compare those returns with the returns from using the optional 25 percent of permitted acreage in soybeans alternative, including production of 0.675 acre of corn, 0.225 acre of soybeans, 0.075 acre in conservation reserve (ACR) set-aside, and 0.025 acre of other nonprogram crop. Finally, evaluate the 0-92 participation alternative, in which up to 100 percent of the base is put into soil-conserving crops.

At harvest delivery prices being offered to farmers in early December of $2.20 for corn with an estimated $0.60 target price deficiency payment and $3.40 for wheat with a $0.50 deficiency rate, participation in feedgrain and wheat programs gives greater net returns for producers with typical yield and cost relationships. The advantage for participation is greater for corn ($206 versus $160) than for wheat ($122 versus $116). Double-cropping wheat land with soybeans or marketing straw reduces the advantage of participating in the wheat program. The break-even market price for nonparticipation in the 1989 programs is approximately $2.60 for corn and $3.60 to $3.70 for wheat.

Substitution of soybeans on the corn base resulted in net returns nearly equal to those for the entire base in corn at the level of prices, costs, and yields used in Table 2. Part of the advantage for the substitution of soybeans can be from growing a profitable nonprogram crop on the portion of reduced acres above those needed for the planted corn acreage. With higher soybean prices and/or lower expected corn yields, substitution of soybeans may appear attractive. However, if the addition of soybeans on the corn base means more continuous soybeans, the producer's decision to substitute soybeans will rest on the trade-off between higher crop returns this year versus the risk of pest infestations that lower future soybean yields.

When expected yields are at normal program production levels, participation in the optional 0-92 land diversion results in much lower net returns than any of the other alternatives for using the corn base acreage. Only owner-operators who have low yield expectations relative to yield payment levels and who can make substantial reductions in variable crop expenditures may profit from the 0-92 option.

Livestock producers considering participating in the program should compare the quantity of feedgrains that could be raised on the idled acres required for participation to the amount of feedgrains that could be purchased with the expected deficiency payments plus the crop costs saved by the idle acres.

The impact of participation in the 1989 feedgrain and wheat programs on farm returns depends upon several factors that may vary with different situations. Three major factors are (1) expected

Table 2. Comparison of Crop Returns per Acre, 1989

	Acres	Production or base (bu or ton)	Harvest price or rate per unit	Crop return or payment	Variable cost[1]	Net return over variable cost
Corn						
Not participate	1.0	135	$2.20	$297.00	$137.50	$159.50
Participate						
Corn	0.9	121.5	2.20	267.30	123.75	
ACR (deficiency for 0.9A)[2]	0.1	108	0.60	64.80	2.00	
Composite base acre	1.0			332.10	125.75	206.35
Participate, soybeans on 25%						
Corn	0.675	91.13	2.20	200.48	92.81	
ACR (deficiency for 0.675A)[2]	0.075	81	0.60	48.60	1.50	
Other nonprogram crop	0.025	...	...	...	0.50	
Soybeans	0.225	10.12	6.50	65.81	16.42	
Composite base acre	1.00			314.89	111.23	203.66
Participate whole base, 0-92 option						
Corn	0.0					
ACR set-aside	0.1	---	---	---	2.00	
Optional conservation-use (CU) diversion	0.9	99.36	0.89[3]	88.43	18.00	
Composite base acre	1.0			88.43	20.00	68.43
Soybeans	1.0	30	6.50	195.60	65.00	130.00
		45	6.50	292.50	73.00	219.50
		54	6.50	351.00	81.00	270.00
Wheat						
Not participate	1.0	54	3.40	183.60	68.00	115.60
Participate						
Wheat	0.9	48.6	3.40	165.24	61.20	
ACR (deficiency for 0.9A)[2]	0.1	40.5	0.50[3]	20.25	2.00	
Composite	1.0			185.49	63.20	122.29
Participate whole base, 0-92 option						
Wheat	0.0	...	...	...	...	
ACR set-aside	0.1	...	...	...	2.00	
Optional CU diversion	0.9	37.26	0.50[3]	$ 18.63	18.00	
Composite base acre	1.0			18.63	20.00	- 1.47
Double-crop soybeans	1.0	20	6.50	130.00	63.00	67.00
Wheat and double-crop soybeans						
Not participate	1.0			313.60	131.00	182.60
Participate						
Composite base acre	1.0			302.49	119.90	182.59
Oats	1.0	60	1.75	105.00	49.00	56.00
		80	1.75	140.00	52.00	88.00
		100	1.75	175.00	57.00	118.00
Hay	1.0	3.0	50.00	150.00	85.00	65.00
		4.5	50.00	225.00	100.00	125.00
		6.0	50.00	300.00	125.00	175.00

[1]Includes seed, pesticides, fertilizer, machinery repairs and fuel, drying costs, and interest on operating capital only.
[2]Quantity for payment is program yield times acres planted. Assume ASCS program yield of 120 bushels for corn and 45 bushels for wheat.
[3]Projected ASCS target prices deficiency payment rates.

Table 3. Estimated Costs per Acre for Producing Crops, 1989

	Rotated corn (135 bu)	Second-year corn (125 bu)	Grain sorghum (120 bu)	Soybeans (45 bu)	Wheat (54 bu)	Oats (80 bu)	Double-crop soybeans (20 bu)	Set-aside cover crop	Mixed alfalfa hay (4.5 tons)
Variable costs:									
Seed	$21	$21	$6	$11	$11	$9	$15	$4	$9
Pesticides	17	32	15	19	1	1	25	...	7
Fertilizer									
N	29	29	27	...	19	12	...	...	...
P, K, lime	24	23	21	19	17	12	8	4	45
Machinery, repair and fuel	24	24	22	20	16	15	12	7	30
Drying fuels and repair	16	15	18	...	...	...	...	...	...
Interest on operating capital	7	8	6	4	4	3	3	1	4
Total variable costs	$138	$152	$115	$73	$68	$52	$63	$16	$95
Other costs:									
Machinery depreciation and interest	$40	$40	$38	$36	$30	$30	$20	$20	$50
Labor	21	21	20	20	10	10	10	7	30
Management	17	16	14	16	9	8	7	...	14
Storing (int. and bin)	26	24	22	18	13	14	8	...	34
Miscellaneous	15	15	15	15	15	15	8	8	15
Total other costs	$119	$116	$109	$105	$77	$77	$53	$35	$143
Land costs (cash rent)	$90	$90	$90	$90	$90	$90	$...	$90	$90
Total all costs									
per acre	$347	$358	$314	$268	$235	$219	$116	$141	$328
per bushel	$2.57	$2.86	$2.62	$5.96	$4.35	$2.74	$5.80	...	$72.89

market prices, (2) expected yields, and (3) the extent to which expenditures can be reduced by idling acres. Other factors include the yield levels that form the basis for payments for idled acres, the value of advance payments in meeting cash flow needs, the value of participation in the commodity loan program, and the availability of profitable other nonprogram crop production opportunities. In the case of wheat, another factor is the effect of participation on double-crop returns and straw returns.

Hence, producers should carefully explore alternatives using worksheet AE-4543, "Income Possibilities: Participation versus Nonparticipation in 1989 Government Programs for Corn or Wheat" and "Planting Soybeans on Program Crop Base." Completed examples are included in this newsletter. Copies of this worksheet are available in county Extension offices.

Prepared by:

R.A. Hinton
Professor emeritus
Farm management

Issued by:

R. P. Kesler

R.P. Kesler

Income Possibilities Worksheet--Participation versus Nonparticipation in 1989 Government Programs for Corn

	Nonparticipation	Basic 10% program	10% ARP with 25% soybean	Total or partial base in 0/92
Program Information				
1. Program crop base	100	100	100	100
2. Permitted acres of program crop (line 1 x 0.9)	XXX	90	90	90
3. Acres planted in program crop	100	90	67.5	0
4. Acres planted to soybeans (line 2 x 0.1 - 0.25)	XXX	XXX	22.5	XXX
5. Acres in other nonprogram crops (max. line 2 x 0.2)	XXX	—	—	XXX
6. Acres double-cropped	(—)	(—)	(—)	(—)
7. a. Reduced acres required ACR set-aside (line 3 x 0.1111)	XXX	10.0	7.5	XXX
b. Reduced acres req. in CU or ONPC [(line 4 + 5 x 0.1111)]	XXX	—	2.5	XXX
c. 0/92 CU req. set aside (line 2 x 0.08 + 0.1111)	XXX	XXX	XXX	17.2
8. 0/92 CU ac. for pay [line 1 - (lines 3 + 7c)]	XXX	XXX	XXX	82.8
9. Total base acres (line 3 + 4 + 5 + 7a + 7b + 7c + 8) = line 1	100	100	100	100
10. Program yield	XXX	120	120	120
11. a. Program production (line 3 x line 10)	XXX	10,800	8,100	—
b. 0/92 CU for pay production (line 8 x line 10)	XXX	XXX	XXX	9,936
12. Expected yield, bu: a. Program crop	135	135	135	—
b. Soybeans	XXX	XXX	45	XXX
c. Nonprogram crop	XXX	—	—	XXX
d. Double-crop	—	—	—	—
13. Expected production: a. Program crop (line 3 x 12a)	13,500	12,150	9,112.5	—
b. Soybeans (line 4 x 12b)	XXX	XXX	1,012.5	XXX
c. Nonprogram crop (line 5, 7b x 12c)	XXX	—	—	XXX
d. Double-crop (line 6 x 12d)	—	—	—	—
Income				
14. a. Program crop (line 13a x mkt. price or loan $ 2.20 /bu)	29,700	26,730	20,048	—
b. Soybean returns (line 13b x mkt. price $ 6.50)	XXX	XXX	6,581	XXX
c. Nonprogram crop (line 13c x mkt. price $ —)	XXX	—	—	XXX
d. Double-crop returns (line 13d x mkt. price $ —)	—	—	—	—
15. Deficiency payment (line 11a x rate for: Corn, $2.84 - 12 mo. ave. 2.24 = $ .60 or Wheat, $4.10 - 12 mo. ave. ____ = $ —)	XXX	6,480	4,860	—
16. 0/92 deficiency (line 11b x $ 0.89 corn or 0.50 wheat)	XXX	XXX	XXX	8,843
17. Other income (for example grazing, straw, int. on adv. pmt.)	—	—	—	—
18. Total income (line 14 + 15 + 16 + 17)	29,700	33,210	31,489	8,843
Variable Costs				
19. Program crop				
a. Fert., crop, and mchy. (line 3 x $ 104 /A)	10,400	9,360	7,020	—
b. Dry, store, and other (line 13a x $ .25 /bu)	3,375	3,037	2,278	—
20. Soybean substitution				
a. Fert., crop, and mchy. (line 4 x $ 68 /A)	XXX	XXX	1,530	XXX
b. Dry, store, and other (line 13b x $ .10 /bu)	XXX	XXX	101	XXX
21. Nonprogram crop (line 5 + 7b x $ — /A)	XXX	—	—	XXX
22. Conservation use crop (lines 7a + 7b + 7c + 8) x $ 20 /A)	XXX	200	200	2,000
23. Double-crop				
a. Fert., crop, and mchy. (line 6 x $ — /A)	—	—	—	—
b. Dry, store, and other (line 13c x $ — /bu)	—	—	—	—
24. Total costs (lines 19 + 20 + 21 + 22 + 23)	13,775	12,597	11,129	2,000
Net Returns Over Variable Costs				
25. Line 18 - line 24	15,925	20,613	20,360	6,843
Gain for Participation				
26. Line 25 Col 2,3,4 - Col 1		4,688	4,435	-9,082

Planting Soybeans on Program Crop Base

Worksheet for determining break-even gross soybean returns (break-even soybean prices and break-even soybean yields) necessary to generate net returns equal to those from the program crop acre to be replaced.

1. Gross returns from program crop
   a. Product sales per acre
      135 bushels x $ 2.20 = $ 297
      (expected yield) (expected price)
   b. Potential deficiency payments per acre
      120 bushels x $ .60 = 72
      (ASCS yield) (expected deficiency payment rate)
   c. Other products (e.g., straw, double-crop)
      — x $ — = —
      (yield) (expected price)
   d. Total gross returns (1a + 1b + 1c) .... $ 369

2. Variable costs of program crop acreage
   a. Grain production costs per acre = 138
   b. Other products' production costs per acre = —
   c. Total variable costs (2a + 2b) .... $ 138

3. Net returns from program crop acreage (1d - 2c) $ 231

4. Variable costs of producing soybeans per acre .... $ 73

5. *Break-even gross soybean returns* (lines 3 + 4) .... $ 304

6. Expected soybean yield per acre .... 45 bu

7. *Break-even soybean price* (line 5 ÷ line 6) .... $ 6.75

8. Expected soybean market price per bushel .... $ 6.50

9. *Break-even soybean yield* (line 5 ÷ line 8) .... 46.8 bu

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

20

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-2 *January 1989*

Projected Financial Outlook for Illinois Livestock Farms

The financial situations of Midwest hog, feeder cattle, and dairy farms are projected from 1989 to 1992 with two initial debt-to-asset levels (20 and 50 percent), and three different price scenarios (weak, moderate, and strong). Assumptions about farm size, production costs, crop mix, and livestock enterprises are based upon northern and central Illinois hog, beef, and dairy farms in the Farm Business Farm Management (FBFM) recordkeeping program.

The economic situation of Illinois livestock farms is projected for the four years 1989 to 1992 assuming the following conditions. Production costs and land values are assumed to remain constant over the four-year period. Capital is replaced each year to maintain the existing capital stock. The interest rate for current, intermediate, and long-term debt is assumed to be 10.5 percent. In each scenario, off-farm income is assumed to be $8,682 and family living expenses are assumed to be $25,439. Crop yields are assumed to be 134 and 47 bushels per acre for corn and soybeans, respectively. Because of the drought of 1988 and the expected reduction in set-aside requirements, each farm is expected to participate in a 10 percent set-aside program in 1989 and beyond. The commodity, livestock, and feed prices used to project the economic situations of Illinois livestock farms are summarized in Table 1. These price estimates were chosen arbitrarily to reflect a range of possible outcomes, and should not be viewed as actual forecasts.

Hog Farms

The hog farm in each scenario consists of 355 acres; 178 acres are owned and 177 acres are rented on a 50-50 crop-share arrangement. Crop production consists of 236 acres of corn and set-aside and 119 acres of soybeans. The farm operator is assumed to own all livestock facilities, and to farrow and finish 179 litters per year, with an average of 7.72 pigs weaned per litter. The results of the hog farm simulations are summarized in Table 2.

Weak prices

Even with weak prices, net farm income is good for the farm with an initial debt-to-asset ratio of 20 percent. The operating loan balance is eliminated in the first year; net worth increases slightly, and the debt-to-asset ratio declines to 18 percent. The return on equity capital, however, is only about 2 percent per year. For the farm with an initial debt-to-asset ratio of 50 percent, net farm income is low, the operating loan balance increases, the net worth decreases, and the ending debt-to-asset ratio increases to 53 percent. Return on equity capital is negative each year and getting worse.

Moderate prices

The farm with a debt-to-asset ratio of 20 percent has a good net farm income, but return on equity capital is still very low at just over 3 percent. The operating loan balance is eliminated in the first year; net worth increases by about $35,000 over the four-year period, and the ending debt-to-asset ratio declines to 17 percent. The farm with a debt-to-asset ratio of 50 percent still has a low net farm income, and return on equity capital remains negative. The operating loan balance increases and the net worth declines each year. The debt-to-asset ratio declines to 49 percent, however, during the four-year period.

Table 1. Commodity prices used to project financial conditions of Illinois livestock farms

Commodity	Unit	Scenario	1989	1990	1991	1992
Corn						
Target price	bushel	all	$2.84	$2.75	$2.75	$2.75
Cash price	bushel	all	2.30	2.20	2.25	2.35
Loan price	bushel	all	1.66	1.56	1.56	1.56
Deficiency rate	bushel	all	0.54	0.55	0.50	0.40
Soybeans	bushel	all	6.75	6.00	5.75	6.00
Supplement	cwt	all	13.00	13.00	13.00	13.00
Veal calves	cwt	all	99.40	99.40	99.40	99.40
Cull cows	cwt	all	48.00	48.00	48.00	48.00
Cull sows	cwt	all	$5.00 less than market hog price			
Feeder cattle	cwt	all	75.50	75.50	75.50	75.50
Market hogs	cwt	weak	40.00	40.00	40.00	40.00
		moderate	42.00	42.00	42.00	42.00
		strong	45.00	45.00	45.00	45.00
Live cattle	cwt	weak	65.00	65.00	65.00	65.00
		moderate	68.50	68.50	68.50	68.50
		strong	72.00	72.00	72.00	72.00
Milk	cwt	weak	10.10	10.10	10.10	10.10
		moderate	10.60	10.60	10.60	10.60
		strong	11.10	11.10	11.10	11.10

Strong prices

The net farm income for both farms is strong, and net worth increases. As expected, the operating loan balance is eliminated for the 20 percent farm, but the 50 percent farm's balance increases slightly each year. The ending debt-to-asset ratio declines to 17 percent for the 20 percent farm and declines to 44 percent for the 50 percent farm. The return on equity capital is positive for both farms.

Above-average hog farm

The previous scenarios used FBFM averages to project financial situations. An average of 7.72 pigs weaned per litter was used in these scenarios. To examine the impact of a better-than-average rate of pigs weaned per litter, we reran the model with an average of 8.48 pigs weaned per litter. This weaning rate would place the farm in the top 25 percent for FBFM record keepers. The projections for a farm with above-average production are shown in Table 3, along with the projected financial situation of the average farm. Both scenarios used moderate prices and a farm with an initial debt-to-asset ratio of 20 percent.

As would be expected, the above-average producer enjoys a higher net farm income, and a return on equity capital that is 1.3 percentage points higher than that of the average farm. Both farms eliminate the operating loan during the first year and have the same debt-to-asset ratio at the end of each year. The ending net worth is almost $17,000 higher after four years for the above-average producer. This indicates the importance of increased efficiency in a hog farm operation.

Hog Farm Expansion

Raising hogs is a popular and profitable enterprise for many Illinois farmers. Hog production is a natural complement to corn and soybean production and diversifies the operation. This section looks at three possible scenarios for the hog farm with an initial debt-to-asset ratio of 20 percent under moderate prices. Comparisons are made between expanding the sow herd by 50 head, increasing share-leased land by 245 acres, and not changing the operation. The no-change scenario assumes all excess funds made by the operation are invested at 8 percent interest.

Both expansions are assumed to take effect in the second year of the four-year projection. For the sow expansion, gilts are kept during the first year, and new hog buildings and equipment are purchased during the second year. The buildings and equipment cost $150,000; $120,000 is financed on

Table 2. Projected financial situations of Illinois hog farms

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
Weak prices					
D/A ratio of 20 percent					
Initial	NA[a]	NA	$15,754	$505,244	20
1989	$29,939	2.4	0	510,421	18
1990	28,837	2.2	0	514,496	19
1991	27,673	1.9	0	518,016	18
1992	28,006	2.0	0	522,809	18
D/A ratio of 50 percent					
Initial	NA	NA	$39,385	$315,776	50
1989	$10,045	-2.5	42,244	307,130	50
1990	9,026	-2.9	59,609	297,465	51
1991	8,077	-3.3	81,360	287,162	52
1992	8,164	-3.4	106,709	277,236	53
Moderate prices					
D/A ratio of 20 percent					
Initial	NA	NA	$15,754	$505,244	20
1989	$35,956	3.6	0	514,390	18
1990	34,854	3.3	0	522,434	18
1991	33,690	3.0	0	530,504	18
1992	34,023	3.0	0	540,078	17
D/A ratio of 50 percent					
Initial	NA	NA	$39,385	$315,776	50
1989	$16,062	-0.6	38,029	311,345	49
1990	15,486	-0.8	50,736	306,338	49
1991	15,026	-0.9	67,475	301,047	49
1992	15,639	-0.7	87,435	296,510	49
Strong prices					
D/A ratio of 20 percent					
Initial	NA	NA	$15,754	$505,244	20
1989	$44,981	5.3	0	519,539	18
1990	43,878	5.0	0	532,731	18
1991	42,715	4.6	0	546,516	18
1992	43,048	4.6	0	561,947	17
D/A ratio of 50 percent					
Initial	NA	NA	$39,385	$315,776	50
1989	$25,087	2.3	31,706	317,668	48
1990	25,174	2.3	37,427	319,647	47
1991	25,448	2.4	46,649	321,873	46
1992	26,850	2.8	58,528	325,417	44

[a]NA = not applicable.

Table 3. Comparison of average hog farms and above-average hog farms; initial debt-to-asset ratio of 20 percent and moderate prices

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
Average farm (7.72 pigs weaned per litter)					
Initial	NA[a]	NA	$15,754	$505,244	20
1989	$35,956	3.6	0	514,390	18
1990	34,854	3.3	0	522,434	18
1991	33,690	3.0	0	530,504	18
1992	34,023	3.0	0	540,078	17
Above-average farm (8.48 pigs weaned per litter)					
Initial	NA	NA	$15,754	$505,244	20
1989	$43,000	4.9	0	518,369	18
1990	42,043	4.6	0	530,537	18
1991	40,807	4.3	0	543,040	18
1992	40,993	4.2	0	557,041	17

[a]NA = not applicable.

a 10-year note at 10.5 percent interest. The expansion of rented acreage assumes the land will have the same yield and crop mix as the existing farm. Additional machinery is also purchased (in addition to normal capital replacement) for the increased acreage. Table 4 summarizes results of the simulations comparing the three scenarios.

Net farm income is stable for the no-change scenario, but return on equity capital drops from 3.6 to 3.0 percent during the four years. Net worth increases by about $36,000 as the debt-to-asset ratio drops to 17 percent. The operating loan balance is eliminated in the first year.

Increasing the amount of share-leased land boosts net farm income and return on equity capital for the second year. Income and return on equity for years three and four are just slightly above the no-change scenario. Net worth increases by $51,000 and the debt-to-asset ratio increases slightly for years two and three, but returns to 20 percent for year four.

The scenario to build new hog facilities and increase the sow herd is by far the weakest. Net farm income is negative for the third year and low in the fourth. After an initial rise in net worth, it falls by nearly $23,000 by the end of the fourth year. The debt-to-asset ratio reaches a high of 32 percent, but starts to fall as income increases in year four.

Feeder Cattle Finishing Farms

The farm used to project the economic situations of Illinois feeder cattle finishing farms consists of 451 acres; 225 are owned and 226 are rented on a 50-50 crop-share basis. Of this land, 355 acres are corn, corn silage, and set-aside, and 96 acres are soybeans. The farm operator is assumed to own all livestock facilities and to feed out 294 head of cattle per year. The results of the simulations for the feeder cattle finishing farms are presented in Table 5.

Weak prices

The feeder cattle farm with a debt-to-asset ratio of 20 percent has a negative net farm income and return on equity capital. The operating loan balance more than doubles over the four-year period, and the net worth declines. The ending debt-to-asset ratio increases to 33 percent. The farm with a debt-to-asset ratio of 50 percent experiences a very large negative net farm income and return on equity capital. The operating loan balance increases substantially, net worth decreases, and the ending debt-to-asset ratio increases to 81 percent.

Moderate prices

The farm with an initial debt-to-asset ratio of 20 percent experiences low or negative net farm

Table 4. Illinois hog farms with initial 20 percent debt-to-asset ratio and moderate prices—increase share-lease versus increase sow herd

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
No change—invest funds at 8 percent					
Initial	NA[a]	NA	$15,754	$505,244	20
1989	$35,956	3.6	0	514,390	18
1990	34,854	3.3	0	522,434	18
1991	33,690	3.0	0	530,827	18
1992	34,023	3.0	0	541,375	17
Increase share-lease by 245 acres					
Initial	NA	NA	$15,754	$505,244	20
1989	$35,956	3.6	0	514,390	18
1990	44,520	5.1	0	532,100	21
1991	35,564	3.3	0	545,585	21
1992	36,083	3.3	0	556,244	20
Increase sow herd by 50 head					
Initial	NA	NA	$15,754	$505,244	20
1989	$31,231	2.6	0	511,353	18
1990	28,147	2.0	0	514,378	32
1991	(8,380)	-5.2	0	486,315	32
1992	12,701	-1.1	0	482,259	31

[a]NA = not applicable.

income, a fairly constant operating loan balance, and a decrease in net worth. The farm with a debt-to-asset ratio of 50 percent is confronted with a rather large net farm loss, increases in the operating loan balance, and a reduction of net worth. Both farms have a negative return on equity capital.

Strong prices

Despite the fact that the finished cattle price is high, the farm with an initial debt-to-asset ratio of 20 percent has only a fair net farm income and a negative return on equity capital. The operating loan balance decreases during the first year and is completely eliminated during the second year. Net worth decreases, while the ending debt-to-asset ratio decreases slightly to 19 percent. The farm with an initial debt-to-asset ratio of 50 percent has a negative net farm income and return on equity capital. The operating loan balance almost doubles, net worth decreases, and the debt-to-asset ratio increases.

Dairy Farms

The farm used to project the economic situation of Illinois dairy farms consists of 275 acres; 137 are owned and 138 are rented on a 50-50 crop-share basis. Of this land, 192 acres are corn, corn silage, and set-aside; 32 acres are soybeans; and 51 acres are hay. The farm operator is assumed to own all livestock facilities and to milk a herd of 56 cows each year, with an average annual milk production of 15,765 pounds per cow. Calves not kept as replacements are sold at 200 pounds as veal calves. Results of the dairy farm simulations are presented in Table 6.

Weak prices

Net farm income is strong for the farm with an initial debt-to-asset ratio of 20 percent. The operating loan balance is eliminated by the end of the first year, and return on equity capital is over 4 percent. Net worth increases and the debt-to-asset ratio is reduced. Net farm income is moderate for the farm with an initial debt-to-asset ratio

Table 5. Projected financial situations of Illinois feeder cattle farms

Scenario/year	Net farm income	Percent return on equiity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
Weak prices					
D/A ratio of 20 percent					
Initial	NA[a]	NA	$32,749	$553,031	20
1989	($9,862)	-4.8	27,503	526,412	21
1990	(12,895)	-5.7	39,538	496,760	25
1991	(15,170)	-6.5	58,437	464,833	28
1992	(16,558)	-7.3	83,690	431,518	33
D/A ratio of 50 percent					
Initial	NA	NA	$81,873	$345,647	50
1989	($31,637)	-14.9	113,484	297,253	56
1990	(36,957)	-19.7	164,663	243,539	63
1991	(41,758)	-27.1	225,232	185,024	71
1992	(45,938)	-40.5	294,947	122,329	81
Moderate prices					
D/A ratio of 20 percent					
Initial	NA	NA	$32,749	$550,036	20
1989	$1,024	-2.8	16,893	534,027	20
1990	(894)	-3.3	17,203	516,100	22
1991	(1,938)	-3.6	22,965	497,310	23
1992	(1,945)	-3.7	33,674	478,539	25
D/A ratio of 50 percent					
Initial	NA	NA	$81,873	$345,647	50
1989	($20,436)	-11.2	102,283	308,454	54
1990	(24,579)	-14.2	141,084	267,118	59
1991	(28,081)	-18.1	187,976	222,280	66
1992	(30,824)	-23.7	242,577	174,699	73
Strong prices					
D/A ratio of 20 percent					
Initial	NA	NA	$32,749	$553,031	20
1989	$12,540	-0.7	8,398	545,517	19
1990	11,514	-0.9	0	536,977	19
1991	11,383	-0.9	0	528,620	19
1992	11,981	-0.8	0	520,901	19
D/A ratio of 50 percent					
Initial	NA	NA	$81,873	$345,746	50
1989	($9,235)	-7.7	91,082	319,655	52
1990	(12,202)	-9.3	117,506	290,696	56
1991	(14,405)	-11.1	150,722	259,534	60
1992	(15,711)	-13.1	190,210	227,066	65

[a]NA = not applicable.

Table 6. Projected financial situations of Illinois dairy farms

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
Weak prices					
D/A ratio of 20 percent					
Initial	NA[a]	NA	$13,642	$489,198	20
1989	$38,963	4.0	0	500,894	18
1990	40,984	4.3	0	514,611	17
1991	40,821	4.2	0	527,612	16
1992	42,535	4.4	0	543,036	14
D/A ratio of 50 percent					
Initial	NA	NA	$34,106	$305,748	50
1989	$19,701	0.2	37,805	304,697	49
1990	21,881	0.9	52,131	305,826	48
1991	22,192	1.0	69,806	306,601	47
1992	24,031	1.6	88,942	309,120	46
Moderate prices					
D/A ratio of 20 percent					
Initial	NA	NA	$13,642	$489,198	20
1989	$43,377	4.9	0	503,387	18
1990	45,398	5.1	0	519,597	17
1991	45,236	5.0	0	535,367	16
1992	46,949	5.1	0	553,626	14
D/A ratio of 50 percent					
Initial	NA	NA	$34,106	$305,748	50
1989	$24,115	1.6	34,738	307,764	48
1990	26,617	2.4	45,675	312,282	47
1991	27,285	2.6	59,702	316,705	46
1992	29,506	3.2	74,917	323,145	44
Strong prices					
D/A ratio of 20 percent					
Initial	NA	NA	$13,642	$489,198	20
1989	$47,791	5.8	0	505,880	17
1990	49,812	6.0	0	524,583	17
1991	49,650	5.7	0	543,120	15
1992	51,363	5.8	0	564,215	14
D/A ratio of 50 percent					
Initial	NA	NA	$34,106	$305,748	50
1989	$28,529	3.1	31,671	310,831	48
1990	31,353	3.9	39,219	318,738	46
1991	32,377	4.1	49,600	326,807	44
1992	34,981	4.8	60,894	337,168	42

[a]NA = not applicable.

of 50 percent, and return on equity capital is just barely positive. Net worth increases slightly over the four-year period. The operating loan balance increases each year, but the debt-to-asset ratio declines to 46 percent.

Moderate prices

Net farm income is strong and net worth increases for the farm with a debt-to-asset ratio of 20 percent. Return on equity capital averages about 5 percent per year. As with weak prices, the loan balance is eliminated and the debt-to-asset ratio declines. The farm with a debt-to-asset ratio of 50 percent also has a fairly strong net farm income, and its net worth increases despite an increase in the operating loan balance. Return on equity capital remains fairly low.

Strong prices

Both farms have a strong net farm income, increasing net worth, and decreasing debt-to-asset ratios. The farm with a debt-to-asset ratio of 50 percent, however, does increase its operating loan balance, while the other farm eliminates its balance during the first year. Return on equity capital ranges from 5.7 percent to 6.0 percent for the farm with an initial debt-to-asset ratio of 20 percent.

Concluding Remarks

The economic scenarios presented in this paper were developed with the use of the Farm Business and Financial Management transition planning model. The results presented here are based largely upon FBFM averages, but the model can easily be applied to specific farms or to assumptions that differ from those used in this paper. The model can be used on a microcomputer and is available through the IlliNet office.

For more information, call (217)333-9513.

Prepared by:

Jeff Kiracafe, graduate research assistant; David Lins, Extension specialist, farm financial management

Issued by:

David A. Lins

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-3 *February 1989*

The Projected Financial Condition of Illinois Cash-Grain Farms

The drought of 1988 and the resulting increases in commodity prices have changed the outlook for cash-grain farms in Illinois. This report projects the financial performance of Illinois cash-grain farms under one set of commodity prices and production costs. These projections are made under different tenure patterns and initial debt-level assumptions. Farmers and their advisers can use this information in evaluating the future financial performance of farm businesses.

Projected Economic Situations of Northern and Central Illinois Cash-Grain Farms

Net farm income is projected four years into the future under three farm tenure patterns (full owner, part owner, and full tenant) at three initial debt-to-asset levels (20 percent, 50 percent, and 70 percent). Assumptions about farm size, production costs, and capital asset values are based upon grain farms in northern and central Illinois whose operators participate in the Farm Business Farm Management (FBFM) record-keeping service.

The farm scenario in these simulations consists of 665 tillable acres. The cropping pattern is 54 percent corn and set-aside (360 acres) and 46 percent soybeans (305 acres) each year. We assume that the farm participates in a 10 percent set-aside program in each of the next four years. This results in 324 acres of corn and 36 acres of set-aside. The full owner is assumed to own all 665 acres. The part owner owns 330 acres and share-rents the rest on a 50-50 basis. The full tenant share-rents the entire 665 acres.

Production costs and land values are assumed to remain constant over the four-year period. Interest rates are assumed to be 10.5 percent on current, intermediate, and long-term debt. Assumed yields are 143 and 45 bushels per acre for corn and soybeans, respectively. This corn yield is also used to project government program benefits. The prices used to project net farm income are summarized in Table 1. Corn target prices are assumed to decline in 1990, as specified in the 1985 farm bill. Cash corn and soybean prices are assumed to decrease slightly and then increase over the four-year period.

Table 1. Commodity Prices Used to Project the Financial Condition of Illinois Cash-Grain Farms

	Year			
	1989	1990	1991	1992
	dollars per bushel			
Corn				
Target	$2.84	$2.75	$2.75	$2.75
Cash	2.30	2.20	2.25	2.35
Loan	1.66	1.56	1.56	1.56
Deficiency	0.54	0.55	0.50	0.40
Soybeans	$6.75	$6.00	$5.75	$6.00

In these simulations, net farm income is projected for each year of the four-year period. It is assumed that off-farm income equals $8,700 and that family living expenses equal $25,000 each year. These amounts reflect FBFM averages. Initial and end-of-year operating loan balances and net worth are reported for each farm, as is the ending debt-to-asset ratio. The return on equity capital is also reported. Production costs are assumed to increase 2 percent per year. Land values are assumed to remain constant.

Northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of *20* percent

Results of the four-year financial projections for northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of 20 percent are summarized in Table 2. Net farm income is strong in all four years for the full and part owners, decreasing and then increasing with the assumed commodity prices. Net farm income is strong in 1989 for the full tenant but decreases below family living expenses in the last three years.

The rate of return on equity for these farms is around 5 percent in 1989 but then decreases to less than 3 percent in the remaining years. These returns are quite low when compared with current opportunities off the farm.

The initial operating loans of the full owner, part owner, and full tenant are eliminated in the first year. An operating loan balance of zero indicates that net farm income, nonfarm income, and initial cash on hand are sufficient during the year to meet assumed family living and tax expenses, principal payments, and down payments on capital purchases.

Over the four-year period, net worth increases and the initial debt-to-asset ratio is reduced for the full and part owners. Net worth also increases for the full tenant, but the debt-to-asset ratio is projected to increase slightly.

The results of the simulations of northern and central Illinois cash-grain farms with initial debt-to-asset ratios of 20 percent are very favorable for the full and part owners. Net farm income is strong and net worth increases. The full tenant's experience is less favorable. He has lower net farm income. Net worth increases and the debt-to-asset ratio increases to only 22 percent These farms can clearly survive and prosper for an extended period of time without any significant changes in their farming operations.

Northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of *50* percent

Results of the four-year financial projections for northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of 50 percent are summarized in Table 3. Net farm income is good and approximately the same in 1989 for all three ownership patterns but not enough to cover family living expenses. Net farm income is then low in the remaining years because of lower commodity prices. The rate of return on equity is projected to be either low or negative for these farms. The operating loan balance increases over the four-year period. The high interest costs associated with these operations force increased short-term borrowing to meet family living expenses and scheduled principal payments.

Over the four-year period, net worth declines for the full and part owners. Net worth declines much less for the full tenant. The debt-to-asset ratio of the full and part owners increases only slightly to 52 and 51 percent, respectively. The full tenant's debt-to-asset ratio decreases but then increases, returning to the initial level of 50 percent.

The results of the simulations of northern and central Illinois cash-grain farms with initial debt-to-asset ratios of 50 percent show low net farm income. Net worth declines and the operating loan balance increases regardless of the tenure pattern.

Northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of *70* percent

Results of the four-year financial projections for northern and central Illinois cash-grain farms with an initial debt-to-asset ratio of 70 percent are summarized in Table 4. Net farm income is negative for the full owner in all four years and in all but the first year of the projection for the part owner. Net farm income is positive but weak for the full tenant.

The operating loan balance increases substantially under each tenure pattern to cover farm losses, scheduled principal payments, and family living

Table 2. Projected Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 20 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset ratio, percent
Full owner					
Initial			$11,889	$1,307,244	20
1989	$76,691	4.4	0	1,348,794	19
1990	57,903	3.0	0	1,374,348	19
1991	55,066	2.9	0	1,401,311	19
1992	58,629	3.2	0	1,432,462	18
Part owner					
Initial			$7,917	$787,359	20
1989	$55,840	4.7	0	814,338	20
1990	41,090	2.9	0	828,405	20
1991	38,485	2.7	0	843,578	19
1992	40,767	2.9	0	860,992	19
Full tenant					
Initial			$8,445	$267,356	20
1989	$34,515	5.9	0	280,737	20
1990	24,276	2.2	0	285,029	22
1991	21,905	1.5	0	288,377	22
1992	22,905	1.8	0	292,109	22

Table 3. Projected Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset ratio, percent
Full owner					
Initial			$73,223	$815,300	50
1989	$23,789	0.7	64,784	821,289	49
1990	6,583	-1.5	90,137	811,138	50
1991	3,232	-2.0	132,801	799,209	51
1992	4,690	-1.9	185,460	788,786	52
Part owner					
Initial			$55,792	$490,765	50
1989	$23,727	1.1	39,221	496,924	49
1990	11,313	-1.5	53,381	490,871	49
1991	8,800	-2.1	81,591	483,200	50
1992	9,864	-2.0	118,298	476,823	51
Full tenant					
Initial			$38,361	$166,229	50
1989	$23,664	3.1	13,658	172,558	46
1990	16,044	-1.6	16,625	170,605	47
1991	14,369	-2.8	30,382	167,148	48
1992	15,037	-2.7	51,180	164,028	50

expenses. Net worth decreases rapidly for all these highly leveraged farms. The full owner's net worth decreases over 36 percent ($178,687). The part owner's net worth decreases approximately 33 percent ($97,537), and the full tenant's net worth decreases 26 percent ($25,825). The debt-to-asset ratios of these farms increase to approximately 80 percent by the end of 1992.

The results of the simulations of northern and central Illinois cash-grain farms with initial debt-to-asset ratios of 70 percent show that significant changes are necessary if these farms are to survive for an extended period of time.

Projected Economic Situations of Southern Illinois Cash-Grain Farms

Net farm income is projected four years into the future for a typical southern Illinois cash-grain farm under three initial debt-to-asset ratios (20 percent, 50 percent, and 70 percent). The farm used in the simulations is 665 acres; 330 acres are owned. The remaining acreage is rented in a 60-40 crop-share, lease arrangement (60 percent tenant, 40 percent landlord).

The cropping pattern and commodity prices (Table 1) are identical to the northern and central Illinois part-owner pattern. Production costs and asset values reflect FBFM averages. Assumed yields are 102 and 33 bushels per acre for corn and soybeans, respectively.

Results of the simulations of southern Illinois cash-grain farms are summarized in Table 5. The farm with an initial debt-to-asset ratio of 20 percent experiences positive net farm income. This income is too low in the last three years, however, to meet family living expenses, so net worth declines. Farms with initial debt-to-asset ratios of 50 and 70 percent experience negative and decreasing net farm income. The rates of return on equity capital are negative in all but one case under all three debt-to-asset categories.

The operating loan balance is eliminated in the first year for the farm with an initial debt-to-asset ratio of 20 percent. The operating loan increases for the farms with initial debt-to-asset ratios of 50 and 70 percent as net farm and off-farm income is insufficient for family living, tax, and term-debt principal obligations. Net worth decreases in all three scenarios, and the ending debt-to-asset ratio increases for the farms with initial debt-to-asset ratios of 50 and 70 percent. The southern Illinois part owner with an initial debt-to-asset ratio of 70 percent is nearly insolvent by 1992.

The results of the simulations of southern Illinois cash-grain farms show low or negative net farm incomes. The farm with an initial debt-to-asset ratio of 20 percent could survive for an extended period of time under these assumptions. The farms with the higher debt-to-asset ratios could not allow the kind of financial conditions presented in Table 5 to continue and would need to institute some type of change in their operations to correct these downward trends.

Buying versus Leasing Land

Some farm businesses in good financial condition are considering buying or leasing more land. This section compares buying to share-leasing an additional 160 acres for the northern and central Illinois part-owner farm. This farm is identical to the farm in Table 2 except that $100,000 cash is assumed to be available for the down payment on the land. The additional land is assumed to be identical in value, yield, and crop mix to the existing farm. The land purchase is 80 percent financed with a 30-year mortgage at 10.5 percent. There is a machinery purchase (in addition to normal capital replacement) and an increase in hired labor associated with the additional acreage. The land purchase and additional machinery purchase are made at the end of year 1 for use in year 2 of the projection in the purchase and share-lease scenarios. Table 6 summarizes results of the simulations comparing no change, purchasing, and share-leasing land. These projections are made assuming constant land values. In Table 6, net income after taxes (instead of net farm income) and the amount of cash and savings (instead of the operating loan balance) are reported.

Net farm income is strong in all scenarios. In the first year, the no-change scenario has the highest net income because of an increase in depreciation (associated with the additional machinery purchase) for the purchase and share-lease scenarios. Net income is highest for the share-lease scenario in years 2 through 4. The net income for the purchase scenario is higher than for the no-change scenario in year 2, but net income for the no-change scenario is higher than for the purchase scenario in years 3 and 4.

Table 4. Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 70 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset ratio, percent
Full owner					
Initial			$111,612	$487,404	70
1989	($11,217)	-6.2	144,024	464,047	71
1990	(31,416)	-11.4	214,283	418,271	74
1991	(38,050)	-14.6	309,750	364,041	77
1992	(40,554)	-17.9	423,941	308,717	81
Part owner					
Initial			$86,709	$293,062	70
1989	$2,423	-5.5	94,508	283,497	71
1990	(11,597)	-11.2	135,377	258,312	73
1991	(15,863)	-14.4	194,843	227,214	77
1992	(16,919)	-17.2	268,508	195,525	80
Full tenant					
Initial			$58,506	$98,806	70
1989	$16,409	-2.0	44,646	99,810	69
1990	8,259	-10.9	59,581	92,132	71
1991	5,998	-15.0	86,401	82,517	74
1992	6,037	-17.3	121,455	72,981	78

Table 5. Projected Financial Conditions of Southern Illinois Cash-Grain Farms

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
Initial D/A ratio of 20 percent					
Initial			$12,922	$547,206	20
1989	$26,120	1.4	0	554,659	20
1990	14,799	-0.7	0	551,508	20
1991	12,233	-1.3	0	546,712	20
1992	13,577	-1.1	0	542,481	20
Initial D/A ratio of 50 percent					
Initial			$49,606	$340,914	50
1989	$3,878	-4.3	43,679	332,666	50
1990	(6,982)	-8.0	68,063	312,283	53
1991	(10,786)	-10.0	107,171	286,576	57
1992	(12,087)	-11.6	157,961	259,521	62
Initial D/A ratio of 70 percent					
Initial			$70,428	$203,481	70
1989	($10,568)	-15.1	85,843	180,946	73
1990	(22,872)	-25.6	133,791	144,054	78
1991	(28,269)	-38.8	199,657	100,162	85
1992	(31,405)	-66.1	280,013	53,788	92

Table 6. Northern and Central Illinois Part-Owner Cash-Grain Farm with Initial Debt-to-Asset Ratio of 20 Percent--Purchase versus Share-Lease Comparison

Scenario/year	Net income after taxes	Percent return on equity	Cash and savings	Net worth	Debt-to-asset ratio, percent
No-change					
Initial			$100,000	$851,567	20
1989	$50,534	5.0	130,527	882,112	20
1990	39,621	3.4	150,781	900,517	19
1991	42,162	3.2	159,589	920,306	19
1992	45,799	3.5	164,127	942,635	17
Purchase					
Initial			$100,000	$851,567	20
1989	$48,996	4.7	41,727	876,587	35
1990	39,967	2.0	20,453	900,451	33
1991	32,935	1.7	26,992	914,202	33
1992	38,425	2.3	19,748	931,020	31
Share-lease					
Initial			$100,000	$851,567	20
1989	$48,996	4.7	130,527	876,587	22
1990	47,456	3.8	142,547	907,939	21
1991	45,096	3.7	160,540	933,851	20
1992	51,381	4.3	168,414	963,625	18

Land value inflation rate needed per year for ending net worth of land purchase scenario to equal ending net worth of

No-change scenario 1.25%

Share-lease scenario 3.43%

The rate of return on equity capital is highest on average for the share-lease scenario, averaging 4.1 percent compared to 3.8 percent for the no-change scenario and 2.7 percent for the purchase scenario. These rates are low compared to opportunities off the farm.

For the no-change and share-lease scenarios, the initial $100,000 of cash grows to over $160,000 at the end of the four-year period. For the purchase scenario, in contrast to the other two, cash and savings on hand decrease approximately $20,000 two years after the farm operator has made a land purchase.

Net worth is the highest at the end of 1992 for the share-lease scenario and the lowest for the purchase scenario. Land values would only need to increase 1.25 percent per year (from the original level of $1,850 per acre), however, for the ending net worth of the purchase scenario to equal the ending net worth of the no-change scenario. The land value increase needed per year for ending net worths of the purchase and share-lease scenarios to be equal is 3.43 percent.

The ending debt-to-asset ratios for the no-change and share-lease scenarios are 17 and 18 percent, respectively. The ending debt-to-asset ratio of the purchase scenario increases to 35 percent after the purchase and declines to 31 percent by the end of 1992.

The simulations in Table 6 indicate that share-leasing additional acreage is preferred in the long run under the kinds of commodity prices and constant land values used in this analysis. Net farm income is generally higher and net worth grows faster. In the long run, however, share-leasing provides little security in terms of farm size. Land would need to inflate approximately 3.5 percent per year for the ending net worth of the purchase scenario to equal the ending net worth of the share-lease scenario. The purchase option may be preferred if farm operators are willing to accept the risks associated with lower net farm income and increased leverage in order to gain the security associated with land ownership and the opportunities of possible capital gains.

The economic scenarios presented in this paper were developed with the help of the transition planning model. The results presented here are based largely on FBFM averages, but the model can be easily adapted to specific farms or to assumptions that differ from those used in this paper. The model can be used on a microcomputer and is available through the IlliNet office.

For more information, call (217)333-9513.

Prepared by:

David Neff
Graduate assistant

David A. Lins
Extension specialist
Farm financial management

Issued by:

David A. Lins

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-4 *March 1989*

Crop Insurance for 1989

The widespread drought-disaster yields of 1988 have reminded producers of the production risks they face. Reduced crop income has made some producers vulnerable to serious financial losses if significant yield losses happen again this year. Formal crop insurance is one way that a producer can reduce the unfavorable consequences of low crop yields.

What Is Crop Insurance?

Crop insurance is available in two forms: (1) limited peril insurance, including commercial hail and fire insurance (H/FCI); and (2) all-risk or multiple-peril crop insurance (MPCI).

H/FCI is offered under spot and area plans. Spot (acre-by-acre) plans pay you for losses based on the percentage loss caused by hail or fire on your damaged acres. Normal yields on nondamaged fields do not reduce payments. In contrast, area hail and fire plans pay you for losses based upon the percentage loss caused by hail or fire averaged across your insured unit.

MPCI guarantees a minimum average yield per acre for the insured crop for the insured unit, with the minimum determined by the deductible you choose. If your average yield (adjusted for quality) for the insured unit falls below the level specified in your insurance policy, the insurance company agrees to pay you the difference.

The guarantees are based on commonly accepted standards for good-quality grain. To calculate an actual yield for insurance purposes, harvested yields are adjusted for quality factors such as grade, kernel quality, and moisture level.

Crop insurance may be attractive to you because:

1. It represents an opportunity to substitute a known cost (annual premiums) for unpredictable and irregular yield losses, particularly catastrophic losses. You can transfer a portion of your yield risk to the insurance industry.

2. It stabilizes your farm's cash flow, so that you can borrow at lower risk and improve access to and terms for borrowed money.

3. It can provide the financial liquidity needed to remain in farming for another year in the event of a significant crop yield loss.

4. It can increase the attractiveness of using cash-forward contracts and hedging using futures because your risk of not being able to perform in accordance with the contract is reduced.

5. The purchase of MPCI may affect your eligibility for USDA programs such as emergency low-interest loans.

Major factors that should influence your MPCI purchase decision include:

1. Your family's financial capacity to withstand a significant crop yield loss-- that is, adequate new worth on your balance sheet to self insure.

2. Your family's willingness to take risk--that is, your family's attitude toward the trade-off between greater profit versus lower risk. Typically, plans with lower risk generate less average profit.

3. The effectiveness of the yield guarantee--that is, the probability or chance that your actual yield will fall below your yield guarantee.

4. The expected benefits of the insurance due to risk reduction versus the annual premium cost.

Development of the MPCI Program

The federal government (USDA) and, to a limited extent, private industry have sponsored some form of multiple-peril crop insurance since 1938. The goal of the Crop Insurance Act of 1980 was to make federal all-risk crop insurance (MPCI) available to growers of major crops as a replacement for the USDA's low-yield disaster program. The Food Security Act of 1985 took that goal a step further.

Beginning with crops harvested in 1987, if MPCI is available in your county you will not be eligible for emergency low-interest disaster loans (EM loans) from the USDA Farmers Home Administration (FmHA) unless you purchase crop insurance. While the Disaster Assistance Act of 1988 waived the crop insurance requirement for emergency disaster loans, it required certain producers to obtain multiperil crop insurance for the 1989 crop as a condition for receiving disaster assistance payments on that crop.

Basic Features of MPCI

What crops does MPCI cover?

MPCI is offered on all ASCS program crops and is now available on most other commercial crops. In most Illinois counties, the crops covered include corn, grain sorghum, soybeans, oats, wheat, and barley. Specialty crops such as hybrid seed corn, apples, green peas, popcorn, and sweet corn are also covered.

How is MPCI marketed?

Crop insurance is marketed by local, private insurance agents who, in most cases, sell crop insurance along with other lines of insurance. Their objective is to provide a full range of insurance protection--from crop insurance to farm and homeowners' policies--to meet farmers' risk management needs.

If a farmer faces a wide range of yield risks, the agent will likely recommend the multiple-peril coverage, which provides protection on most crops against practically all unavoidable causes of loss. In contrast, if the primary risk is hail and fire damage, the agent would likely recommend commercial H/FCI. Blending MPCI and commercial H/FCI protection into a comprehensive package is becoming common. Such a package reduces the substantial deductible of MPCI plans and expands the range of peril covered by H/FCI.

What causes of yield losses are covered?

MPCI, on most crops, covers unavoidable production losses caused by any adverse weather conditions, including drought, excessive temperature, lightning, flood, hail, wind, and tornado. It also covers unavoidable losses caused by insect infestation, plant disease, wildlife, fire, and earthquake.

MPCI crop insurance does not cover losses resulting from neglect, poor farming practices, or theft. Some perils on some specialty crops may be excluded as well. In addition, there are specific restrictions on some crops based upon acceptable farming practices, such as continuous production of potatoes. Reduced coverage can be obtained, however, for the base MPCI premium if late planting occurs. Also, there is a prevented planting enforcement for some crops. See a qualified crop insurance agent for details of exceptions for the crop you raise.

How much coverage can be purchased?

There are two decisions that determine the amount of coverage: (1) the level of coverage (that is, the amount of deductible); and (2) the price at which yield losses are converted to cash.

Your insurance yield is an estimate of your 10-year average yield based on your actual production history (APH), your ASCS program yield, and county average yields. Actual production history provides coverage based upon your proven performance record, not county averages.

Level of coverage

You have the option of insuring at one of three coverage levels:

(1) 75 percent of your insurance yield (that is, 25 percent deductible), (2) 65 percent of your insurance yield (that is, 35 percent deductible), or (3) 50 percent of your insurance yield (that is, 50 percent deductible).

MPCI indemnity payments are made if your yields (adjusted for quality) fall below your insurance guarantee.

Your yield guarantee per acre is equal to:

Insurance yield x coverage purchased (that is, 50, 65, or 75 percent).

For example, if your insurance yield is 120 bushels per planted acre and you purchase 65 percent coverage (35 percent deductible), your yield guarantee would be:

120 bushels per acre x 0.65 = 78 bushels per planted acre

Commodity indemnity price elections

You must select one of three indemnity price elections to convert yield losses into cash. For example, for corn to be harvested in 1989, low, medium, and high price elections for corn are $1.50, $2.00 and $2.60 per bushel, respectively. The price elections for selected crops in Illinois are presented in Table 1.

How are MPCI indemnity payments calculated?

If your average yield per acre (adjusted for quality) is greater than your yield guarantee, no indemnity is paid. If your average yield per acre is less than your yield guarantee, the indemnity paid is equal to:

(yield guarantee minus average yield for insured unit) x indemnity price.

For example, using our previous case, if your yield was 40 bushels per planted acre, your indemnity payment would be:

78.0 bushel-per-acre yield guarantee - 40.0-bushel-per-acre realized yield) x $2.00 per bushel indemnity price = $76 per planted acre.

Indemnity payments are taxable income.

What does multiple-peril crop insurance cost?

Premium rates are based on your historical yields and the loss history for the county in which you farm. The premium rate, dollars per $100 protection, varies with your 10-year average yield level. Table 2, for example, depicts the premium rate structure for corn grain in Livingston County in central Illinois. High-risk areas on your farm that are prone to overflow, poor drainage, drought or high salt content are delineated separately, and special rates are assigned to those areas.

You have the option of buying MPCI with or without hail and fire coverage. However, if you chose to opt out of the hail and fire insurance component of MPCI, an equivalent dollar amount of hail and fire coverage must be purchased as a separate hail and fire policy.

Premiums are generally due around the normal harvest period; if they are not paid within 30 days of billing, interest may be charged for late payment. Premium payments are a tax-deductible expense.

Table 1. Indemnity Price Elections for Selected Insurable Crops in Illinois, 1989

	Price elections, dollars per bushel		
Crop	**Low**	**Medium**	**High**
Barley	$1.10	$1.30	$1.60
Corn	1.50	2.00	2.60
Grain sorghum	1.50	1.85	2.40
Oats	0.40	1.10	1.25
Soybeans	5.00	5.50	Market basis[1]
Wheat	2.25	2.60	3.00

[1]The market basis price election shall be equal to 85 percent of a sample average of the settlement prices for the succeeding November soybean futures contract traded on the Chicago Board of Trade during the last five days of trading in March of the crop year. This election will be rounded to the nearest whole cent and will not be less than $5.50 for 1989.

Table 2. Multiple Peril Crop Insurance Premium Rate Schedule for Nonirrigated Corn Grain in Livingston County, Illinois

Approved insurance yield, bushels per acre	Subsidized premium protection rates					
	50%		65%		75%	
	With hail and fire	Without hail and fire	With hail and fire	Without hail and fire	With hail and fire	Without hail and fire
	percent					
55 and below	2.3	2.0	3.2	2.7	5.8	4.9
56 to 57	2.0	1.6	2.7	2.2	4.9	4.2
71 to 86	1.5	1.2	2.1	1.8	3.8	3.2
87 to 102	1.3	0.9	1.8	1.4	3.2	2.7
103 to 119	1.1	0.8	1.5	1.1	2.7	2.3
120 to 135	1.0	0.7	1.3	1.0	2.4	2.0
136 to 151	0.9	0.6	1.3	0.9	2.2	1.8
152 to 166	0.8	0.6	1.1	0.8	2.1	1.7
167 and above	0.8	0.6	1.1	0.8	2.0	1.6

To encourage broader MPCI participation, Congress authorized a 30 percent subsidy for premiums at the 50 percent and 65 percent coverage levels included in the quoted rates. If you choose 75 percent coverage, however, you must pay the full additional premium cost over the 65 percent level. You also benefit from the federal government paying all of the administrative costs to operate the program. These two subsidies reduce your premium cost by about 50 percent of the level necessary to be profitable for a private insurance company.

Your premium per acre is calculated as follows:

yield guarantee x indemnity price
selected x premium rate.

For example, if we use our case-example yield guarantee of 78 bushels per acre, an indemnity price of $2.00 per bushel, and a premium rate of 1.3 percent, the premium is:

78 bushels per acre x $2.00 per bushel
x 0.013 = $2.03 per acre.

The 1.3 percent premium rate is based upon 65 percent coverage for the approved insurance yield span of 120 to 135 bushels per acre. The rate is circled in Table 2.

Do I have to insure all of my crop?

If you purchase MPCI for a particular crop, all of that crop that you are raising in the same county must be insured. It is not possible to just insure the portion of a crop that is most susceptible to loss. However, each crop is insured separately, so you may insure one crop without having to insure a second crop produced in the same county.

"Insurable farm unit" is a key concept used by the insurance industry. A single farm (located in one county) represents one unit. If you crop-share rent a second farm, the rented acreage constitutes a second unit. Providing proper records are maintained, you may qualify for more than one unit if your land is located in separate sections. Because there is an advantage in having more than one insurable unit for a farm, there is an additional premium. A qualified crop-insurance agent can define the insurable units for the land you farm.

When must MPCI be purchased?

MPCI must be purchased by the date specified as the end of the sales period. In Illinois, the closing date for winter crops is September 30; for spring crops, it is April 15.

When must hail and fire coverage be purchased?

In contrast to MPCI, H/FCI protects up to the "actual cash value" of the crop (for example, 120 bushels of corn x $2.00 = $240). This protection can usually be purchased at any time during the growing season with a 24- to 48-hour delay before the insurance goes into effect.

Risk Reduction from MPCI

Figures 1, 2, 3, and 4 indicate how purchasing MPCI, participation in the government program, and the combination of MPCI purchase and government program participation reduce the risk of low returns for corn producers. All four figures are based on distributions for prices and yields ranging from $1.80 to $3.40 per bushel and 68 to 190 bushels per acre, respectively.

In these examples, we assume that an individual producer's yield does not affect the market price. Price and yield distributions are not predictions for 1989, but they do serve to demonstrate the risk that producers may face. They imply no marketing strategy. The examples assume $200 in fixed costs. The variable costs change with yield, but are based on $138 per acre for a yield of 135 bushels per acre. The government program payments are based on a 120-bushel established yield, and the APH is 122 bushels per acre.

Figure 1 shows the distribution of per-acre returns above all costs for the base case without participation in the government program or MPCI. This individual faces a distribution of returns ranging from -$195 to $279 per acre. The probability of negative returns is approximately 0.54. In other words, this farmer has a 54 percent chance of incurring losses and a 46 percent chance of reaping positive profits. Likewise, there is a 14 percent chance that the losses will exceed $100 per acre. A 16 percent chance exists for profits above $100 per acre.

Figure 2 shows the protection that MPCI provides for the producer. The returns range from -$151 to $273 per acre. The highest returns are approximately $6 per acre (the premium is $6.25) less than those without insurance. The chance of losses is approximately the same as in Figure 1; however, the risk of losses exceeding $100 per acre is almost zero. For yield levels above the yield guarantee, $6.25 per acre (the MPCI premium) is given up to provide the protection against the losses. The chance of reaping returns above $100 per acre is 15 percent.

Another form of insurance is participation in the government set-aside program. The government price support program provides both yield and price protection, but the producer must forego plantings on 10 percent of his base acres. Figure 3 shows the impact on the distribution of returns for an individual who participates in the set-aside program. Again, market price and yield distributions are the same as before; however, if the market price is below the target price, deficiency payments are forthcoming on the base yield.

Because of the price support protection and the reduced number of planted acres, expected returns above all costs are from -$126 to $230 per acre. In this case, the chance of negative returns is reduced to 20 percent. There is an 80 percent chance of positive profits. Moreover, there is only a 4 percent chance that losses will exceed $100 per acre. Highest returns are $230 per acre. The probability for returns above $100 is 0.14.

Figure 4 shows the distribution of returns for a participant in the set-aside program who buys MPCI. He has a 21 percent chance of losses, but they should not exceed $75 per acre. The highest returns are $224 per acre. A 10 percent chance exists for returns above $100 per acre.

These examples should help producers understand the tradeoffs involved in the decision to buy MPCI. Each producer must decide how much risk he personally will accept. Figure 2, when compared with Figure 1, indicates that it costs only $6.25 per acre to protect against the chance of $44 in additional per-acre losses ($195 - $151). The individual who has chosen to participate in the government set-aside program is protected against additional losses of $51 per acre ($126 - $75). These decisions are also very dependent on the ASCS established yield, APH, expected yields and prices, financial stability, and family goals.

Evaluating the All-Risk MPCI Insurance Program for Your Farm

Insurance can convert the small chance of a large loss into a certain small loss. In farming, insurance can take the form of formal policies on structures, crops, or life, and informal arrangements such as money for a rainy day, extra feed held against crop failure, or a diversified enterprises combination.

Formal and informal types of insurance are basically the same. Both have costs, such as premium payments in the case of formal insurance and loss of income in the case of informal insurance. Furthermore, dollar costs generally exceed dollar gains; that is, premium payments to an insurance company must exceed indemnity payments to the insured by an amount large enough to cover administrative costs and company profits. This excess of dollar costs over dollar returns makes it evident that producers do not insure against specified perils to make money; they insure for security or safety.

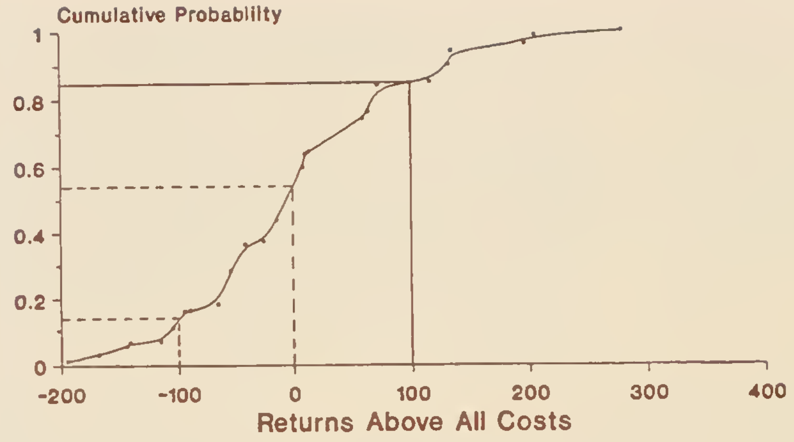


Figure 1. Expected per-acre returns above all costs for corn.

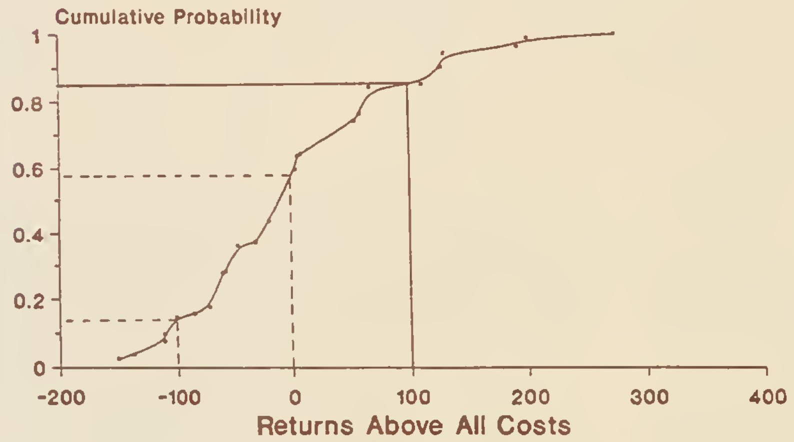


Figure 2. Expected returns above all costs for corn with MPCI at the 75 percent yield level and $2.60 price selection.

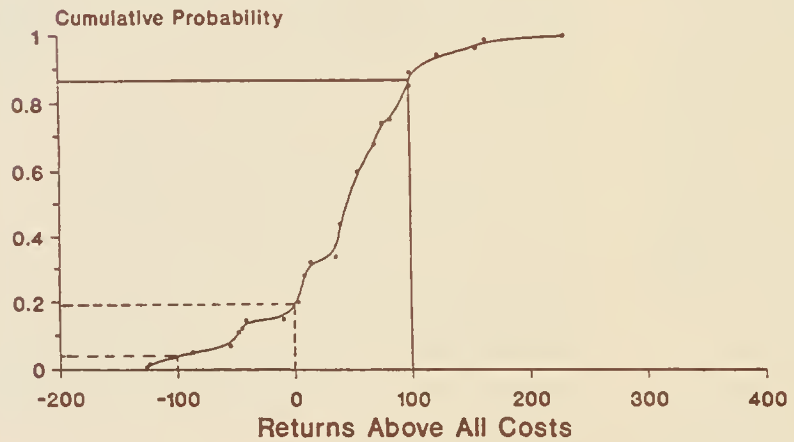


Figure 3. Expected returns above all costs for 90 percent corn and 10 percent set-aside.

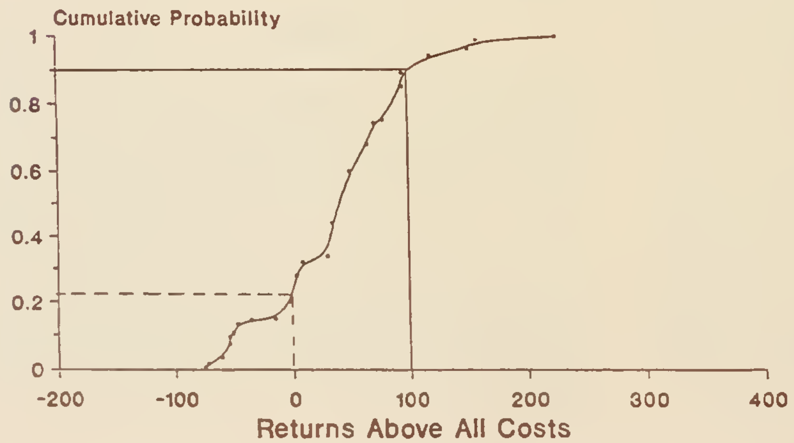


Figure 4. Expected returns above all costs for 90 percent corn and 10 percent set-aside with MPCI at the 75 percent yield level.

MPCI WORKSHEET
Analysis of Per-Acre Net Cash Flow
Crop: **Corn**
Livingston County Example

	Disaster Year		Typical Year	
	With Insurance	Without Insurance	With Insurance	Without Insurance
Projected crop sales and other cash inflows				
1. Enter yield/planted acre.	40 bu	40 bu	135	135
2. Enter expected market price.	$ 2.20	$ 2.20	$ 2.20	$ 2.20
3. Expected sales: line 1 x line 2.	$ 88	$ 88	$ 297	$ 297
4. Enter other receipts (deficiency payments[1], straw, etc).	$ 69	$ 69	$ 69	$ 69
5. Total receipts: line 3 + line 4.	$ 157	$ 157	$ 366	$ 366
MPCI Premium				
6. Enter insurance yield.[2]	120 bu	XXX	120 bu	XXX
7. Enter level of coverage (0.50,0.65, or 0.75).	65%	XXX	65%	XXX
8. Enter crop price election.[3]	$ 2.00	XXX	$ 2.00	XXX
9. Liability: line 6 x line 7 x line 8.	$ 156	XXX	$ 156	XXX
10. Enter premium rate for the desired level of coverage.[2]	1.3%	XXX	1.3	XXX
11. Insurance premium: line 9 x line 10.	$ 2.03	XXX	$ 2.03	XXX
Projected crop cash requirements				
12. Enter preharvest cash operating expenses.[4]	$ 100	$ 100	$ 100	$ 100
13. Enter harvest cash expenses per acre[4]	$ 15	$ 15	$ 15	$ 15
14. Enter expenses per bushel (25¢ x yield)	$ 10	$ 10	$ 34	$ 34
15. Enter debt service, family living, and other fixed cash requirements.[5]	$ 100	$ 100	$ 100	$ 100
16. Total cash requirements: line 12 + line 13 line 14 + line 15.	$ 225	$ 225	$ 249	$ 249
Projected MPCI payment received				
17. Enter line 6 x line 7.	78 bu	XXX	78	XXX
18. Enter line 17 - line 1 (enter zero if answer is a negative number).	38 bu	XXX	0	XXX
19. Insurance payment received: line 18 x line 8.	$ 76	XXX	0	XXX
NET CASH FLOW: line 5 - line 11 - line 16 + line 19	$ 5.97	$ (68)	$ 117	$ 115

[1]Assumes a deficiency payment of $0.60 multiplied by a program yield of 115 bushels per acre for a total of $69.
[2]Insurance yields and premium rates for a specific farm can be obtained from MPCI agents.
[3]Price elections are crop specified, and one of these must be selected by farmers. Price elections are available from MPCI agents.
[4]Crop expenses should be estimated from your records. Use cash expenses only.
[5]Family living expenses on Illinois Farm Recordkeeping Farms averaged $44 per acre in 1987.

Producers who incurred at least 65 percent reduction or more in yields and received disaster assistance payments are required to enroll in the MPCI all-risk crop insurance in at least the minimum coverage levels in 1989. Other producers must consider financial capacity to bear risk, willingness to bear risk, effectiveness of the yield guarantee, expected benefits due to risk reduction, and eligibility for USDA programs when deciding on participation in all-risk MPCI crop insurance.

The capacity to bear risk is based on your balance sheet. Your lender requires a balance sheet because he or she needs to know if you have adequate equity or net worth to protect yourself against adverse events such as significant yield reductions if they should occur.

By analyzing your cash flow plan and evaluating the impact of a significant yield reduction, you can get an assessment of your willingness to accept risk. Changes in cash flows also relate directly back to the balance sheet situation. The accompanying MPCI Worksheet organizes the data needed to calculate cash flow outcomes and the effectiveness of crop insurance from alternate yield scenarios and coverage levels.

In evaluating expected benefits from all-risk crop insurance versus the annual premium payment, logic suggests that benefits outweigh premium costs. Federal 30- percent subsidization of the 50 percent and 65 percent coverage premiums means that average expected indemnities would exceed expected premiums in the long run. This need not be true for every individual producer. Yet this factor causes some high-risk producers to consider MPCI participation as income enhancing.

The use of these strategies to reduce downside risk is recommended by the insurance industry for promoting peace of mind. The avoidance of catastrophic losses--no matter how remote the probability of these occurrences--is still the major consideration in deciding whether or not to participate in the MPCI all-risk crop insurance at the appropriate level of coverage.

Prepared by:

Royce A. Hinton
Rob Hornbaker

Issued by:

Robert H Hornbaker

Rob Hornbaker

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
At Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative
Extension
Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-5 *April 1989*

Cost of Growing Corn and Soybeans in 1988

In 1988, the total of all costs per acre for growing corn in Illinois averaged $339 in the northern section, $343 in the central section with the higher soil ratings, $314 in the central section with the lower soil ratings, and $265 in the southern section. The soybean costs per acre were $273, $279, $251, and $209, respectively (see Table 1). Costs were lower in the southern section primarily because land costs were lower there. The total of all costs per bushel in the different sections of the state ranged from $2.90 to $5.23 for corn and from $7.21 to $10.91 for soybeans. Variations in this cost were related to weather factors, yields, and land quality. The extreme variations in the cost per bushel of raising corn and soybeans in 1988 were due to the drought-reduced yields in certain areas of the state.

These figures were obtained from farm business records kept by farmers enrolled in the Illinois Farm Business Farm Management Association. The samples included only farms with more than 260 acres of productive and nearly level soils in each area of the state; these are farms without livestock. Farms located in 22 counties north and northwest of the Illinois River are included in the sample for northern Illinois. Farms from 36 counties below a line from about Mattoon to Alton are in the sample for southern Illinois. The remaining 44 counties make up the sample for central Illinois. The sample farms averaged 654 tillable acres in northern Illinois, 679 acres in the central section with high soil ratings, 743 acres in the central section with lower soil ratings, and 840 acres in southern Illinois. This analysis includes some factors in the cost of doing business that nonagricultural businesses may not include. These factors are not used as expense items on income tax returns. Examples include the charge for labor performed by the farm operator, a rental charge for the use of owned and rented land, and an interest charge on equity in machinery and inventories of grain and livestock.

Nonland Costs

Soil-fertility costs for soybeans were allocated on the basis of phosphorus, potassium, and lime removals, with the residual cost allocated to corn. The seed, crop, chemical, and drying expenses also included some commercial drying and storage and the estimated value of home-raised seed. The costs of fuel, machine hire, and repairing machinery were reduced for income received from custom work. Labor costs included the cash value of hired labor, plus a charge for available unpaid labor at a rate of $1,250 per month. Building and storage costs were for repairs and depreciation only. The nonland interest rate in 1988 was set at 10 percent; this figure was then multiplied by the sum of half the average inventory value of crops at the beginning and the end of the year, the depreciated value of machinery and buildings, and half the total operating expenses. The result is the total nonland interest charge. Overhead costs included insurance, utilities, the farm share of light-vehicle expenses, and miscellaneous items. No charge has been made in this analysis for management. This charge might normally be about 5 percent of the total cost per bushel, or 15 to 25 cents for corn and 35 to 50 cents per bushel for soybeans.

Land Costs

These costs included the adjusted net rent and the real estate taxes. Net rent was

Table 1. Costs Per Acre in 1988 for Growing Corn and Soybeans on Illinois Grain Farms Without Livestock

	Corn				Soybeans			
	North	Central[1]	Central[2]	South	North	Central[1]	Central[2]	South
Number of farms	311	578	268	228	311	578	268	228
Acres in crop	313	295	317	290	226	294	300	312
Nonland costs								
Variable costs:								
Soil fertility	$53	$54	$53	$52	$17	$18	$18	$18
Pesticides	22	21	19	19	26	25	23	20
Seed	23	22	22	18	11	12	12	12
Drying and storage	9	7	6	4	3	3	3	1
Repairs, fuel, and hire	28	27	27	30	22	23	23	26
Total, variable costs	$135	$131	$127	$123	$79	$81	$79	$77
Percent change from 1987	2	-2	-2	5	4	7	10	4
Other nonland costs:								
Labor	$27	$30	$27	$28	$27	$27	$24	$26
Buildings and storage	11	8	9	7	8	4	4	4
Machinery depreciation	21	22	19	20	17	17	15	16
Nonland interest	27	22	22	15	24	20	19	14
Overhead	12	12	12	9	12	12	12	9
Total, other costs	$98	$94	$89	$79	$88	$80	$74	$69
Total, nonland costs	$233	$225	$216	$202	$167	$161	$153	$146
Percent change from 1987	-4	-5	-5	-1	-4	-3	0	-2
Land costs								
Taxes	$19	$21	$18	$9	$19	$21	$18	$9
Annually adjusted net rent	87	97	80	54	87	97	80	54
Total land cost	$106	$118	$98	$63	$106	$118	$98	$63
Total, all costs	$339	$343	$314	$265	$273	$279	$251	$209
Percent change from 1987	-2	-2	-2	0	-1	0	2	0
1988 yields, bushels per acre	76	83	60	91	29	30	23	29
Nonland cost per bushel	$3.07	$2.71	$3.60	$2.22	$5.76	$5.37	$6.65	$5.03
Total, all costs per bushel	$4.46	$4.13	$5.23	$2.90	$9.41	$9.30	$10.91	$7.21
1985-1988 average yield	126	144	123	118	42	45	39	36
Nonland cost per bushel	$1.85	$1.56	$1.76	$1.71	$3.98	$3.58	$3.92	$4.06
Total, all costs per bushel	$2.69	$2.38	$2.55	$2.25	$6.50	$6.20	$6.44	$5.81

Note: The entries shown below "dash" line are costs based on 1985-1988 average yields.
[1] Soil productivity ratings of 86-100.
[2] Soil productivity ratings of 56-85.

represented as the average rent received by crop-share landlords on recordkeeping farms for the period from 1984 to 1987. Caution is needed in interpreting differences in land costs between areas. In the long run, the net rent residual return to landowners should tend to equalize the total cost of production.

Cost Per Bushel

Production costs per bushel of corn increased dramatically in 1988 as compared to 1987 due to the significant drop in yields caused by the drought. The increase in costs per bushel ranged from $0.99 in southern Illinois to $2.87 on central Illinois farms with the lower soil ratings. The drop in average corn yields ranged from a 48-bushel-per-acre decline in southern Illinois to a 76-bushel drop on central Illinois farms with the lower soil ratings. Corn yields in these two areas were 27 and 63 bushels lower respectively than the four-year average from 1985 to 1988. While yields dropped dramatically, total costs per acre changed very little in 1988 as compared to 1987. Total costs per acre to produce corn in southern Illinois did not change from the year before while total costs per acre dropped 2 percent in central and northern Illinois. Corn yields in northern and in central Illinois on farms with the higher soil ratings were 50 and 61 bushels per acre lower than the average for the 1985 to 1988 period.

Production costs per bushel of soybeans also increased dramatically in 1988 as compared to 1987, again due to the lower yields that were caused by the drought. The increase in costs per bushel ranged from $1.38 in southern Illinois to $4.91 on central Illinois farms with the lower soil ratings. Average soybean yields dropped in a range of 7 bushels per acre on southern Illinois farms to 18 bushels per acre on central Illinois farms with the lower soil ratings. Total costs per acre in 1988 did not vary much from 1987. There was no change in total costs per acre in southern Illinois and on central Illinois farms with the higher soil ratings. Total costs declined 1 percent on northern Illinois farms and increased 2 percent on central Illinois farms with the lower soil ratings. Average soybean yields in the different areas of the state were 7 to 16 bushels per acre lower than the four-year average from 1985 to 1988.

The total of all costs per acre to produce corn has decreased 17 percent, from $390 per acre in 1981 to $324 per acre in 1988. Out-of-pocket cash costs such as fertilizer, chemicals, and seed have declined only $11 per acre during this period. Other nonland costs, such as machinery depreciation and interest charges, have decreased by $45 per acre because of fewer purchases of machinery and equipment. This cutback in purchase, along with lower interest rates, has lowered the nonland interest charge on capital invested in the business. In addition, lower land values resulting from lower incomes have decreased the adjusted net rent for land. Total costs per acre to produce soybeans have declined 15 percent, from $308 per acre in 1981 to $261 per acre in 1988. All of the decrease has come from the other nonland and land costs (Table 1). Variable costs have actually increased slightly since 1981. The factors that reduced the total cost per acre to produce corn were also the reasons that total cost per acre to raise soybeans declined.

Current corn and soybean selling prices are near or above the average total 1988 cost of production when using the average yields for the past four years. An owner-operator with average yields during the past four years (1985 to 1988) would need $0.91 to $1.07 per bushel for corn and $1.80 to $2.14 per bushel for soybeans to recover the variable costs listed in Table 1. Recovering the total of all costs would require receiving $2.25 to $2.69 a bushel for corn and $5.81 to $6.50 a bushel for soybeans. Individual tenants and landowners computing the average break-even cost per bushel for growing corn and soybeans should divide the costs and yields shown in the table as they are shared by the terms of the lease.

Farmland values are related to grain prices and the nonland costs of production because income left after other costs have been deducted is considered the return to land. Values for Illinois farmland increased by about 7 percent in 1988, after having declined by almost 50 percent since 1979. This turnaround was due to improved farm earnings and a return to farmland that was more competitive with alternative nonfarm investments. Farm earnings for 1988 will be lower in many areas of the state when compared to 1987, due to the drought. To date, this has not seemed to have had a very large negative impact on land values. While the drought reduced 1988 earnings, it has also helped reduce our burdensome grain supplies. Grain prices have increased and are more in line with the cost of production when using long-term average yields. Future farm earnings will be more dependent on factors that occur in our global economy as we can expect less income support from government farm programs. To remain competitive in the future, farm operators will need to place a high priority on the marketing function of their farming operation while continuing to control costs.

Prepared by:

Dale H. Lattz, Extension specialist, Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

CES
Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-6 *May 1989*

The Financial Position of Illinois Farm Operators: Costs and Returns from Crop and Livestock Enterprises

Drought Reduces Farm Earnings, Decreases Net Worth

This report, based on the summaries of Illinois Farm Business records, reviews the financial status of Illinois farm operators over the past four years. Farm operator earnings were lower in 1988 due to the drought that severely reduced yields in most areas of the state. Higher feed costs reduced earnings from livestock enterprises. Higher grain prices, stable input costs, and assistance from the government drought relief program prevented farm operator earnings from falling more than they did. Increased emphasis on marketing as well as continued monitoring of costs will be important as future earnings will be more dependent on global market factors and less on government farm programs.

Records kept by 3,587 farmers enrolled in the Illinois Farm Business Farm Management Association (FBFM) record-keeping program have been used to estimate changes in net worth from 1985 to 1988. On a cost basis, without considering inflation or deflation of capital asset values, the change was calculated by adding net farm and net non-farm income and subtracting family living expenses and income and Social Security taxes (Table 1). Using this procedure, the net worth of the average Illinois farm operator increased by $2,333 in 1985, by $848 in 1986, by $15,372 in 1987, and decreased by $497 in 1988.

The change in net worth on a balance sheet based on fair market value would be affected negatively if it included the change in land values from 1985 to 1987. Land values increased during 1988, which would positively affect the change in net worth. Net worth changes would vary greatly among farms and areas in the state.

Net farm income is the accrued value of the operator's share of farm production less total operating expenses, including the amount of interest paid and depreciation, plus gain or loss on machinery or buildings sold. When added to net nonfarm income, this is the income available to pay for family living expenses and income and Social Security taxes. This is also the source of income used to pay the principal on long-term debt and to invest into savings. Estimates used in Table 1 for net nonfarm income and withdrawals for living expenses and taxes were based on a sample of 322 central Illinois farm families. These families identified all sources of farm and nonfarm funds and the uses of these funds for precise expenditures. These expenditures were then adjusted downward by 10 percent to reflect the larger-than-average farms in central Illinois.

Capacity for Repayment of Capital Debt

The average amount available to each farm operator for repayment of capital debt was estimated at $26,136 in 1985, $22,149 in 1986, $35,120 in 1987, and $16,573 in 1988 (Table 1). These were the funds estimated to be available for capital purchases and payment of principal on long-term debt. The table shows actual dollar commitments per farm that were made for capital purchases of machinery, equipment, or buildings. Results from the last four years indicate that the amount spent for capital purchases has been less than the funds available for capital debt repayment. From 1985 to 1988, capital purchases were lowest in 1985. Funds available for repayment of capital debt were highest in 1987.

The records show that funds available for debt repayment varied more among areas in the state in 1988 than in 1987. Estimated changes in net worth in 1988 were positive for the southern one-third of Illinois and in western Illinois. All other areas of the state had decreases in net worth. Estimated changes in net worth ranged from a $24,000 increase in southern Illinois to a $15,000 decrease in the central Illinois area that was hit hardest by the drought.

Interest Paid as a Percentage of Gross Farm Returns

The amount of interest paid by an FBFM operator averaged 9.2 percent of gross farm returns in 1987, compared to 12.2 percent in 1986, 13.1 percent in 1985, and 14.3 percent in 1984. The average cash interest paid in 1987 was $14,371. This was $2,736 lower than 1986 and $4,492 lower than 1985. The average cash interest paid in 1988 was $13,611, $760 lower than 1987. The average interest paid as a percentage of gross farm returns, however, will be slightly higher in 1988 compared to 1987 due to lower gross returns caused by the drought. Farm incomes in 1987 were the highest of any year in the 1980s. This was reflected in the fact that in 1987, only about 2 percent of the farm operators had negative farm incomes, compared to 8 percent in 1986 and 14 percent in 1985. These 2 percent were paying over 35 percent of their gross farm returns for interest. The 1988 incomes for farm operators were closer to the 1985 and 1986 average incomes. The percentage of farms having negative farm incomes in 1988 will be greater than in 1987 due to the reduced incomes caused by the drought. Farm incomes in the northern two-thirds of the state were affected most by the drought while incomes in the southern one-third were relatively good as yields were closer to long-term averages.

Costs and Returns from Crops

Corn and soybeans are crops that make important contributions to net farm incomes and the financial status of farm operators. Figures 1 and 2 show the cost and return per bushel of both corn and soybeans produced each year from 1978 to 1988 on 500 central Illinois grain farms with high-quality soils and no livestock. Note that the total cost of growing a bushel of corn has exceeded the average annual Illinois corn price in six of the ten years since 1979. The difference between the total of all costs and the total nonland cost line is the charge for the use of land. The deficits indicate that profits (returns for risk and management) had to come from equities in capital, primarily land, or other unpaid inputs, such as operator labor or debt-free facilities. Although these deficits have continued, land values have stabilized, partly because the government farm program has provided income support.

Variable cost reflects the total of cash expenditures for fertilizer, pesticides, seed, and drying, which are normally shared according to the terms of the lease on rented farms, plus the cost of fuel, and machinery hire and repair. Other nonland costs include labor, depreciation, interest, building upkeep, and overhead.

Total costs per acre of corn produced in 1988 decreased 2 percent from these costs in 1987. However, significantly lower yields on these sample farms caused by the drought resulted in a substantially higher cost of production in 1988 than in 1987. Using the past four-year average corn yield of 144 bushels per acre, costs per bushel of corn produced are now averaging about $0.91 for the variable cost, $1.56 for the total nonland cost, and $2.38 for the total cost.

Figure 2 shows the cost and return per bushel of soybeans produced on these same farms from 1978 to 1988. The total cost has exceeded returns each year since 1980 with

Table 1. Estimated Change in Net Worth and Capacity for Repayment of Capital Debt for 3,587 Illinois Farm Operators

	All Illinois counties			
	1985	1986	1987	1988
Net farm income	$22,037	$21,575	$39,753	$24,503
+ Net nonfarm income[a]	8,721	8,526	8,682	8,500
- Family living expenses[b]	24,503	25,868	26,505	26,500
- Income and Social Security taxes[b]	3,922	3,385	6,558	7,000
Change in net worth	$ 2,333	$ 848	$15,372	$ -497
+ Depreciation	23,803	21,301	19,748	17,070
Funds available for capital debt repayment	$26,136	$22,149	$35,120	$16,573
Capital purchases	$13,875	$14,674	$14,637	$15,292
Cash interest paid	$18,863	$17,107	$14,371	$13,611

[a]Actual amounts identified from a central Illinois sample of 322 farms for 1985, 1986, 1987; amounts for 1988 are estimated.
[b]Actual amounts identified from a central Illinois sample of 322 farms for 1985, 1986, and 1987 reduced by 10 percent; amounts for 1988 are estimated.

the exception of 1985. Drought-reduced yields significantly increased the cost per bushel to produce soybeans in 1988. With a normal yield of 45 bushels per acre, costs per bushel are now averaging about $1.80 for the variable cost, $3.58 for the total nonland cost, and $6.20 for the total cost.

Costs and Returns from Livestock

Livestock have also been important to the current financial status of farm operators. The cost and return per hundredweight of pork produced annually from 1978 to 1988 on a sample of 80 farrow-to-finish enterprises with an average of 155 litters per year are shown in Figure 3. Lower pork prices and higher feed costs in 1988 resulted in total costs exceeding total returns for the first time in three years. Feed costs increased 25 percent in 1988 as compared to 1987 as the drought drove up grain prices. Higher pork production reduced pork prices.

The average returns above the cost of feed and purchased animals from the annual records of about 1,500 individual livestock enterprises from 1984 to 1988 are shown in Table 2. This is the return available to pay for labor, machinery, equipment and building repairs, depreciation, livestock expense, taxes, overhead, and an interest charge on all capital used. There is no profit until these costs are covered. The last five-year average returns from the farrow-to-finish hog, feeder-pig finishing, and dairy enterprises covered total costs. Based on the estimates of nonfeed costs in Table 2, the average returns above all costs from 1984 to 1988 for farrow-to-finish hogs were $19.81 (returns above feed and purchased animals) minus $17.80 (nonfeed costs), or a positive $2.01 per hundred pounds produced. For feeder-pig finishing enterprises, returns per hundredweight were above all costs by an average of $0.04. Feeder cattle showed returns per hundredweight that were $6.31 short of covering all costs; dairy returns averaged $11 per cow above all costs, whereas beef cow herds were $111 short per cow.

Returns to livestock in 1988 were lower than 1987 returns mainly due to higher feed costs. In addition, prices received for pork and milk were lower. Fat cattle prices were higher but the cost of replacement feeders also increased. Dairying was the only livestock enterprise

Costs and Returns -- Corn, Soybeans, and Pork

(Shading indicates total costs exceeding the price on all charts.)

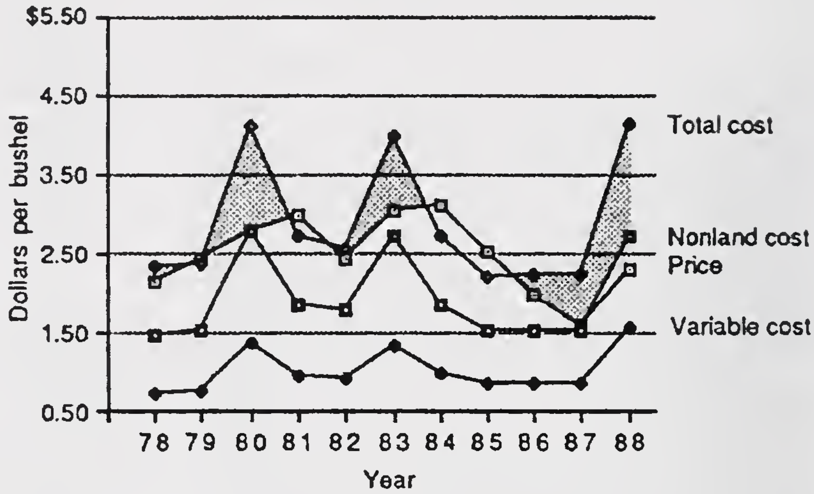


Figure 1. Costs and returns per bushel of corn produced on central Illinois grain farms from 1978 to 1988. Soil productivity rating 86-100.

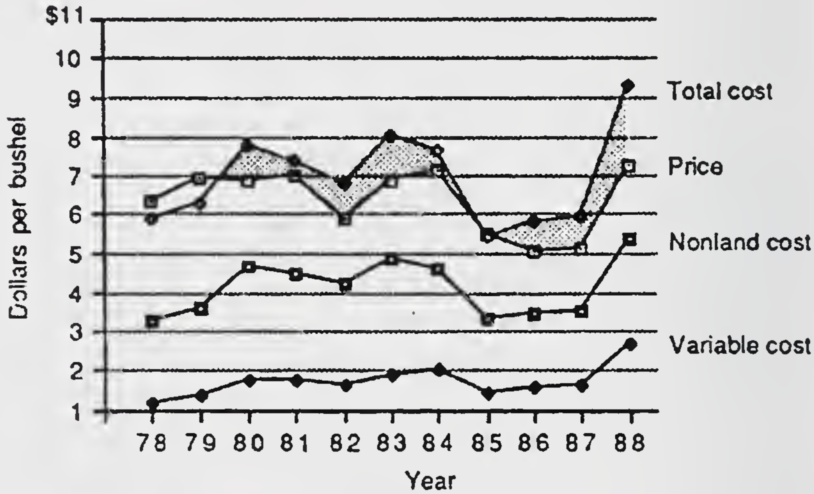


Figure 2. Costs and returns per bushel of soybeans produced on central Illinois grain farms from 1978 to 1988. Soil productivity rating 86-100.

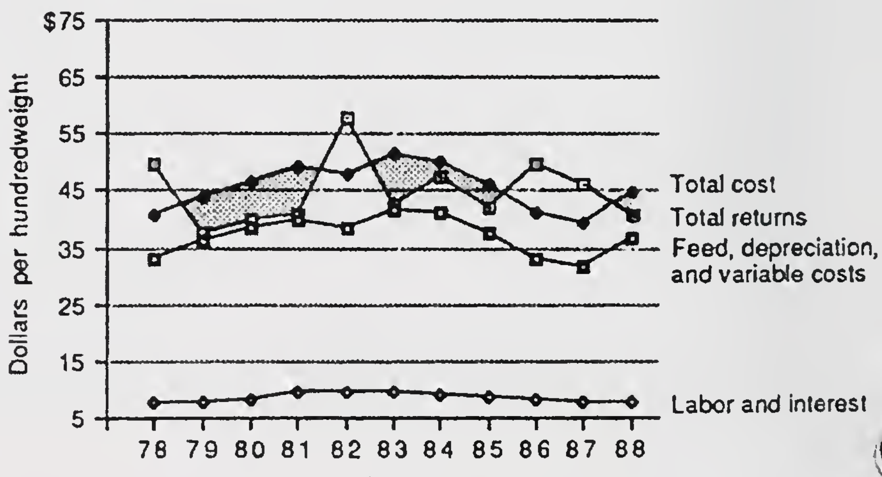


Figure 3. Costs and returns per hundredweight of pork produced on farms with under 250 litters, from 1978 to 1988.

where management returns were positive in 1988. Livestock producers who use their own capital without borrowed funds have large amounts of non-saleable labor, feed, or buildings, and those producers who are more efficient than the average farmer have been in the best position to withstand the narrower profit margins.

Table 2. Returns above Cost of Feed and Purchased Animals to Livestock Enterprise Units from 1984 to 1988

Year	Farrow-to-finish hogs	Feeder-pig finishing	Feeder cattle	Dairy cattle	Beef herd[a]
	per hundredweight			*per cow*	
1984	$16.72	$10.98	$20.39	$ 995	$ 21
1985	16.71	7.00	8.86	1,054	5
1986	26.50	16.06	17.93	1,062	85
1987	25.09	13.28	30.47	1,301	212
1988	14.01	6.63	20.56	1,116	196
5-year average	$19.81	$10.79	$19.64	$1,106	$104
Nonfeed costs, 1984-1988					
Direct cash	$ 6.05[c]	$ 4.00[b]	$12.20[c]	$ 380[c]	$ 30[b]
Other costs	11.75[c]	6.75[b]	13.75[c]	715[c]	185[b]
Total	$17.80	$10.75	$25.95	$1,095	$215

[a]The feed cost for beef herds includes up to $60 of hay equivalent from salvage roughage.
[b]Includes veterinary costs, utilities, fuel, equipment and building repair costs, depreciation, labor, and other nonfeed costs, including interest on feeder livestock, from Table 6, *Farm Management Manuals*, 1984 to 1988.
[c]Estimates of annual nonfeed costs are based on enterprise cost studies of operative units from 1984 to 1987.

Prepared by:

Dale H. Lattz, Extension specialist, Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 West Gregory Drive
Urbana, Illinois 61801

URBANA ILL. MAY 15 '89 US POSTAGE 0.25

FIRST CLASS

Illinois Documents Section
State Library
351 Centennial Bldg.
Springfield, IL 62756

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-7 *May 1989*

Test-Demonstration Farm Results Summarized for Five Counties in the Illinois

Results from farms in five counties that took part in the Illinois Test-Demonstration Farm program have been compiled and are now available. Thirteen farms from Edwards, Jackson, and White counties participated in the program in 1987, bringing to a close the collection of data over a period of five years. Eleven farms from Bureau and Douglas counties began the first year of their five-year period of data collection in 1988. The five counties all worked with the Cooperative Extension Service of the University of Illinois College of Agriculture and the Tennessee Valley Authority (TVA) to collect data for the program. The Tennessee Valley Authority supports the program financially.

The Test-Demonstration Farm program emphasizes the "whole-farm approach" to management decisions and farm business operation. Farmers are selected for a five-year period to demonstrate the use of fertilizer and combinations of other resources that will contribute to increased income. The program has five major objectives, which are:

1. To introduce TVA experimental fertilizers and to demonstrate them in educational programs that promote more efficient fertilizer use;
2. To develop a complete, well-balanced, efficient, and profitable farm-business organization on each farm;
3. To encourage cooperators to manage their farms to provide evidence to other farmers of the results of improved practices, efficient enterprises, and profitable farm-business operations;
4. To use the "whole-farm" demonstrations as educational tools to develop agriculture in the community and in the county; and
5. To apply research results from the College of Agriculture to the program.

Results from Edwards, Jackson, and White Counties in 1987

Thirteen farms participated in the 1987 Test-Demonstration program. Edwards and White counties each had five cooperating farms. Jackson County had three cooperating farmers. Of the thirteen farms, eleven are one-man operations; the other two are partnerships.

The average operator's share of net farm income for Edwards, Jackson, and White county participants in 1987 was $16,667, $2,809, and $25,788, respectively (Table 1). The net farm income is defined as the value of farm production less farm products consumed, total operating expenses, and depreciation; plus any gain or loss on machinery or buildings sold. Net farm income also includes the return to the farm and family for unpaid labor, the interest on invested capital, and the returns to management.

The operator's labor and management earnings for 1987 are given in Table 1--$16,998 for Edwards County, –$6,292 for Jackson County, and $17,099 for White County. Earnings are derived by subtracting the value of family labor and the interest on equity capital from the net farm income. It is the residual

Table 1. Average Operator's Share in the Test-Demonstration Program in Edwards, Jackson, and White Counties, Illinois, 1987

	Edwards	Jackson	White
Soil Productivity Rating	55	53	50
Number of farms	5	3	5
Number of tillable acres	591	179	737
Cash operating income	167,278	29,790	152,163
Gross farm returns	123,448	30,205	120,261
Cash operating expenses	91,469	18,239	79,467
Farm products consumed	1,378	90	707
Income before depreciation	32,859	11,877	40,087
Depreciation	16,192	9,235	14,299
Farm operating income	16,667	2,642	25,788
Gain or loss in inventory values	0	167	0
Net farm income	16,667	2,809	25,788
Interest on equity capital	– 1,066	9,101	8,688
Unpaid family labor	735	0	0
Operator's labor and management earnings	16,998	– 6,292	17,099
Unpaid operator's labor	14,700	13,475	13,883
Management returns	2,298	– 19,767	3,216
Total capital investment	$296,269	$137,560	$250,010

return for all the unpaid labor and management efforts of the operator.

The management returns are the residual surplus left after a charge for unpaid labor and the interest on equity capital are deducted from the net farm income. The management returns for Edwards, Jackson, and White counties were $2,298, –$19,767, and $3,216, respectively. The operator's share of capital investment for the participants at the end of the year were $296,269 for Edwards County, $137,560 for Jackson County, and $250,010 for White County.

The figures in Table 1 reflect the effects of the weather in 1987. The summer weather had a strong, positive effect on crop production and the income figures show the results of the good crop year. All three counties experienced relatively good yields as a result of the good weather conditions. Yields are given in Table 2.

In Edwards County, the participating farms averaged 119.6 bushels per acre for corn, 36 bushels per acre for soybeans, and 55 bushels per acre for wheat. The three farms that produced hay in Edwards County averaged 3.5 tons per acre of production.

In Jackson County, the corn yield was 98 bushels per acre; soybeans, 40 bushels per acre; and wheat, 44 bushels per acre. The average hay production in Jackson County was 2.7 tons per acre. The White County participants reported yields of 122.7 bushels per acre for corn, 32.7 bushels per acre for soybeans, and 57.7 bushels per acre for wheat.

The average prices received by the cooperators are given in Table 3. Corn receipts averaged $1.63 per bushel in Edwards County, $1.36 in Jackson County, and $1.87 in White County. Soybean prices ranged from $4.82 received in White County to an average of $5.00 in

Table 2. Average Reported Yields of Test-Demonstration Farms in Three Illinois Counties in 1987

	Edwards	Jackson	White
	----------bushels/acre----------		
Corn	119.6	98	122.7
Soybeans	36	40	32.7
Double-crop soybeans	14	0	27.5
Wheat	55	47.7	57.7
Hay (tons/acre)	3.5	2.7	0

Table 3. Average Prices Received by Test-Demonstration Participants for Three Crops in 1987

	Edwards	Jackson	White
	----------price/bushel----------		
Corn	1.63	1.36	1.87
Soybeans	4.97	5.00	4.82
Wheat	2.24	1.92	2.74

Jackson County. Edwards County reported soybean receipts of $4.97 per bushel. The wheat receipts per bushel were $2.24, $1.92, and $2.74 for Edwards, Jackson, and White counties, respectively.

Results from Bureau and Douglas Counties in 1988

Eleven farms from Bureau and Douglas counties participated in the Test-Demonstration Farm program in 1988--six from Bureau County and five from Douglas County. The average operator's share of net farm income for Bureau and Douglas county participants in 1988 was $29,451 and $17,150, respectively (Table 4).

The operator's earnings from labor and management are also given in Table 4--$14,639 for Bureau County and $8,073 for Douglas County. The management returns for Bureau and Douglas counties were –$2,444 and –$6,427, respectively. The operator's share of capital investment at the end of the year was $494,647 for Bureau County and $358,225 for Douglas County.

The summer weather in 1988 had a negative effect on crop production, and the income figures show the results of a crop year plagued by a drought. Both counties experienced reduced yields as a result of the adverse weather conditions. Yields are given in Table 5.

In Bureau County, the participating farms averaged 73.8 bushels per acre for corn, 28.3 bushels per acre for soybeans, and 88.5 bushels per acre for oats. The Douglas County participants reported yields of 93.6 bushels per acre for corn, 34.8 bushels per acre for soybeans, and 72 bushels per acre for wheat.

The average prices per bushel received by the cooperators are given in Table 6. Corn receipts averaged $2.32 in Bureau County and $1.91 in Douglas County. The soybean prices ranged from $6.67 in Bureau County to an

Table 4. Average Operator's Share in the Test-Demonstration Program in Bureau and Douglas Counties, Illinois, 1988

	Bureau	Douglas
Soil Productivity Rating	81	94
Number of farms	6	5
Number of tillable acres	587	805
Cash operating income	274,206	152,175
Gross farm returns	180,183	136,476
Cash operating expenses	140,369	93,631
Farm products consumed	81	0
Income before depreciation	48,405	41,634
Depreciation	19,003	24,464
Farm operating income	29,402	17,150
Gain or loss in inventory values	49	–20
Net farm income	29,451	17,150
Interest on equity capital	12,937	9,077
Unpaid family labor	1,875	0
Operator's labor and management earnings	14,639	8,073
Unpaid operator's labor	17,083	14,500
Management returns	– 2,444	– 6,427
Total capital investment	$494,647	$358,225

Table 5. Average Reported Yields of Test-Demonstration Farms in Two Illinois Counties in 1988

	Bureau	Douglas
	bushels/acre	
Corn	73.8	93.6
Soybeans	28.3	34.8
Wheat	*	72.0
Legumes (tons/acre)	8.0	5.0
Oats	88.5	*

*Crop not grown in the county.

Table 6. Average Prices Received by Test-Demonstration Participants for Selected Crops in 1988

	Bureau	Douglas
	--------------*price / bushel*---------------	
Corn	2.32	1.91
Soybeans	6.67	6.01
Wheat	*	3.50
Oats	1.76	*

*Crop not grown in the county.

average of $6.01 in Douglas County. Douglas County reported wheat receipts per bushel of $3.50, while Bureau County reported oat receipts of $1.76 per bushel.

These farm records are collected by Test-Demonstration participants from these various counties every year. This information can be used to make sound management decisions and to develop financial statements required in the acquisition of credit. The information collected over several years can also help to identify areas needing special attention. The basis of the 1987 and 1988 summaries is the Farm Business Farm Management Service. For more information on results, refer to the *1987 Progress Report: The Test-Demonstration Farm Program in Edwards, Jackson, and White Counties* and the *1988 Progress Report: The Test-Demonstration Farm Program in Bureau and Douglas Counties.* Copies can be obtained by writing to Duane E. Erickson, 305 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801.

Prepared by:

Duane E. Erickson, Extension economist, farm management, and Bryan Fredrick, graduate research assistant.

Issued by:

Duane E. Erickson

Duane E. Erickson

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-8 *June 1989*

How Income Is Derived and Spent in Selected Illinois Farms Over a Four-Year Period

In 1988, the total, noncapital living expenses of 365 farm families enrolled in the Illinois Farm Business Farm Management Association (FBFM) averaged $26,439—or $2,203 a month for each family (Table 1). This average was 3.9 percent higher than 1987, 5.9 percent higher than 1986, and 9.1 percent higher than 1985. Another $3,403 was used to buy capital items such as the personal share of the family automobile, furniture, and household equipment. Thus, the grand total for living expenses averaged $29,842 for 1988, compared with $29,450 for 1987, or a $392 increase per family. Each family spent $608 less for capital items, while noncapital expenses increased $1,000 per family. The sample farms, which were classified as grain farms, were located primarily in central Illinois in a 15-county area bounded by Jacksonville, Peoria, Champaign, and Mattoon.

How these families use their funds depends somewhat on the levels of net income from farm and nonfarm sources and the priority of the expenditure. In this sample, the 1988 net farm income decreased significantly (by $18,950 per farm) because of lower grain yields caused by the drought, while the net nonfarm income increased by $972 from 1987. Lower prices for pork and higher feed costs also lowered incomes on livestock farms. Higher grain prices and assistance from the government drought relief program prevented farm incomes from being reduced even more.

The amount of interest expense paid by each farm decreased from $14,966 in 1987 to $12,907 in 1988. Interest paid as a percentage of farm receipts dropped from 8.5 percent in 1987 to 7.9 percent in 1988. This percentage has been declining since it peaked in 1983, when the amount of interest paid as a percentage of farm receipts was 15.3 percent. As a percentage of cash operating expenses, the interest paid dropped from 11.9 percent in 1987 to 11.3 percent in 1988. Relatively low interest rates, a reduction in the amount of money being borrowed, and extensive use of Commodity Credit Corporation (CCC) loans were all reasons for the lower amounts of interest being paid. Farm receipts per tillable acre decreased $18; cash operating expenses, including interest, decreased $15. Interest payments per tillable acre decreased from $23 to $20, while noncapital living expenses increased from $38 to $40. Machinery and building purchases decreased from $13,808 in 1987 to $13,237 in 1988, which were at the lowest level for farms in this study since 1974, when the data were first available.

Debt-to-Asset Ratio Declines

The sample of farms showed an average debt of 58 cents for each $1 of farm assets as of December 31, 1988; machinery was valued at cost, less depreciation. The debt for each $1 of assets was 61 cents on December 31, 1987. Although the value of farm assets has declined, the amount of debt per farm has also declined. This debt-to-asset ratio would be lower if machinery were valued at the current market value. Including nonfarm assets would also lower the ratio.

The farms in this sample were 39 acres larger than the average acreage of the 7,350 farms in the FBFM recordkeeping program. Crop yields averaged about 5 percent above those reported by the Illinois Crop Reporting Service. Even so, the net farm income for this sample was less than the average for all the

Table 1. Average Sources and Uses of Funds Over a Four-Year Period and by Noncapital Living Expenses for Selected Illinois Farms

	All records, average per farm				Family of 3 to 5, 1988[a]	
	1988	1987	1986	1985	High-third	Low-third
Number of farms in sample	365	328	324	313	80	80
Tillable acres farmed	661	665	651	629	793	512
Acres owned	116	119	124	119	118	87
Farm assets, January 1[b]	$321,422	$327,059	$361,276	$378,911	$345,973	$229,083
Farm assets, December 31[b]	303,897	326,706	356,244	383,228	328,929	219,680
Liabilities, January 1	187,670	203,647	223,214	220,968	222,594	129,402
Liabilities, December 31	175,131	199,282	212,064	234,155	214,969	116,466
Net farm income	17,438	36,388	25,555	25,677	20,698	15,022
Source of dollars						
Net nonfarm income	$ 9,654	$ 8,682	$ 8,526	$ 8,721	$ 9,165	$ 10,839
Money borrowed	91,872	129,694	123,445	137,065	121,009	59,163
Farm receipts	163,138	176,181	167,938	157,042	192,464	127,168
Uses of dollars						
Interest paid	$ 12,907	$ 14,966	$ 20,421	$ 22,144	$ 16,352	$ 10,015
Cash operating expenses	101,802	111,011	100,983	96,761	123,236	79,592
Capital farm purchases	13,237	13,808	16,603	15,589	14,477	13,082
Payments on principal	104,689	134,024	134,604	123,430	129,114	72,558
Income and Social Security taxes	7,926	7,287	3,762	4,358	7,813	6,688
Net new savings and investment	–5,739	4,011	–5,206	13,320	–8,233	–7,019
Living expenses						
Contributions	$ 1,049	$ 1,224	$ 1,236	$ 1,145	$ 1,395	$ 565
Medical	3,505	3,264	3,226	3,146	4,320	2,761
Insurance, life and disability	1,997	2,111	2,139	2,209	2,339	1,246
Expendables	19,888	18,840	18,364	17,735	28,185	14,474
Total noncapital expense	26,439	25,439	24,965	24,235	36,239	19,046
Capital	3,403	4,011	3,777	2,991	3,640	3,208
Total, living expenses	$ 29,842	$ 29,450	$ 28,742	$ 27,226	$ 39,879	$ 22,254
Percentage change, total noncapital living expenses	3.9	1.9	3.0	0.0		

[a] Records were sorted into high- and low-third categories according to total noncapital living expenses.
[b] Modified cost basis except bare land values were held at current values between January 1 and December 31.

farms in the program for the second year in a row as many of these farms were located in central Illinois, where grain yields were severely reduced by the drought. The average net farm income for farms in this sample was $7,065 less than the $24,503 received by all the farms in the recordkeeping program. Average living expenses were estimated at 15 to 20 percent above the average of all Illinois farmers having gross sales per farm of $40,000 or more, because the average net farm income for the sample is usually higher than for all farms in the state.

In 1988, the average age of the operators of the 365 farms was 43 years. The family averaged 3.5 members, with the age of the oldest child being 9 years. They farmed 661 tillable acres, of which they owned 116 acres, or 18 percent. The operators kept records so that all the sources of farm and nonfarm funds balanced with all the funds used in a complete monthly cash-flow accounting system.

In Table 1, the average total living expenses for individual farm families are divided into five categories for 1985 through 1988. The "expendables" category includes cash spent for food, operating expenses, clothing, personal items, recreation, entertainment, education, and transportation. Cash spent for capital improvements exceeding $250 is not included. The use of a rented house on an estimated 40 to 50 percent of the farms in this sample also is not included, since these data cover only cash outlays.

Net nonfarm income, which is the excess of nonfarm taxable income over nonfarm business expense, was $9,654 in 1988, or 32 percent of the total living expense; in 1987, the excess was 29 percent. It includes dividends on stocks, interest on savings and money-market funds, income from other nonfarm investments, and income from off-farm labor performed by family members.

Assets, Liabilities Also Decline

In 1988, the value of farm assets for the 365 farms in this sample continued to decline. Liabilities also decreased when compared with a year earlier. The value of assets on December 31, 1988, was $17,525 less than January 1, 1988. The decline reflects the lower value of grain on hand due to lower yields. The decline also reflects a drop in government farm program deficiency payments that are due to farm operators. As grain prices have increased, the amount of the payments due from the government has dropped. Machinery is being replaced at a slower rate than depreciation levels, thus further reducing farm assets. Since land values were held constant between January 1 and December 31 in this study, the change in the value of farm assets does not reflect a 7 percent increase in values between 1987 and 1988. At the same time, liabilities decreased by $12,539. These farms borrowed $37,822 less and paid $29,335 less for principal payments than a year earlier. The decrease in loan activity partly reflects a drop in the amount of government Commodity Credit Corporation (CCC) grain loans, due to the fact that grain prices were substantially above the CCC loan rates. The $13,237 spent on capital purchases for machinery and equipment—or $20 per tillable acre—was less than half the amount common before 1980.

Although interest payments continue to be one of the highest farm expenses, the amount paid in 1988 continued to decline, compared with payments in 1987. The amount of cash interest paid in 1988 was the lowest since 1979. The interest expense includes that paid on operating, intermediate, and real estate debt. Interest paid increased from 12 percent of the total farm operating expense in 1979 to 21 percent in 1983 and dropped to 11 percent in 1988. The $12,907 interest payment in 1988 was 7.9 percent of total cash farm receipts, down from 8.5 percent in 1987.

The records from farm families with three to five persons were sorted into two categories, the high-third and the low-third, according to their noncapital living expenses. The total living expenses for the high-third group averaged $39,879, compared with $22,254 for the low-third group. The high-third group farmed 281 more acres than the other group and owned 15 percent of the land farmed; the low-third group owned 17 percent of the land farmed. The larger farms in the first group had more income for living expenses and income tax. Net farm plus nonfarm income was $29,863 for the high-third group, compared with $25,861 for the low-third group. The average age of operators in the high-third group was 40 and the number of family members was 4.2, compared with 37 years of age and 3.9 family members for the other group. Subtracting total living expenses from the total net farm and nonfarm income results in a negative balance of $10,016 for the high-third group and a positive balance of $3,607 for the low-third group. It is interesting to note that although the low-third group had less money to spend, their income exceeded what was spent for family living expenses. On the other hand, the high-third group spent more than their income for family living, even though their income was greater than that of the low-third group.

Net farm incomes dropped significantly last year compared to 1987. This decline, along with other reasons, will cause farmers to borrow more money in 1989. As farmers borrow more, it will become increasingly important to closely monitor all receipts and expenditures. Therefore, it is important that more farmers learn how to monitor and balance their cash flow each month. Computer programs are now becoming available in more service centers such as some FBFM Association district offices. These centers are prepared to offer services to help farmers project monthly cash flow on computer printouts so that they can compare projections with their actual results.

For farmers with low equity or very high debt-to-asset ratios, this type of accounting is essential. These operators need to account for all of their sources and uses of funds to help them make sound financial management decisions.

The data summarized in this process may also serve as a guide in budgeting allowances for family living expenses. The living expenses for families in this sample totaled $45 for each tillable acre farmed. This has not varied more than $4 per tillable acre since 1981. If $15 per tillable acre of the nonfarm income is set aside for living expenses, the remaining $30 would have to be generated from the farm business. Since 1974, this latter figure has ranged from $27 to $36 per tillable acre. Each family must determine how much each acre of crop or each litter of hogs should contribute to their family living. This amount, when added to production costs and other obligations, can help to determine break-even prices needed for products sold.

Publication Offers Guidelines on Managing Farm Employees

As both the size and complexity of farm businesses increase, farm managers will need to familiarize themselves with personnel management. *Farm Personnel Management*, a new publication issued by the Cooperative Extension Services of the North Central Region, gives tips for managing farm personnel.

An outgrowth of the increasing number of multifamily businesses in agriculture is the potential for personnel relationship problems. The publication provides principles and guidelines on hiring and keeping effective and efficient farm employees.

The prime audience for the publication is managers of farm personnel but it is also helpful to Extension personnel, consultants, and others who work with farm managers. Copies, at $3.25 each, can be obtained by requesting *Farm Personnel Management*, NCR 329, from the Office of Agricultural Communications and Education, University of Illinois, 69N Mumford Hall, 1301 West Gregory Drive, Urbana, Illincis 61801.

Prepared by:

Dale H. Lattz,
Extension specialist,
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-9 *July 1989*

Illinois Farm Property Taxes in 1988: Are Per Acre Taxes on the Increase?

The weakened farm economy of the 1980s that reversed the longstanding trend of ever-increasing property taxes on Illinois farmland has resulted in a continuous decline in the taxable value of farm real estate throughout the decade. The assessed value of farms in downstate Illinois declined 39.4 percent between 1981 and 1986 after taking inflation into account. The weakened farm tax base began to cause average per acre taxes to decline in 1984, and the decline continued through 1987. The average per acre taxes paid on Illinois grain farms increased 67 cents per acre--from $14.31 to $14.98--from 1987 to 1988. The average tax on the more productive northern and central Illinois grain farms was $18.19 in 1987 and $18.67 in 1988.

The increase in per acre taxes paid reflects the combined impact of legislatively frozen certified assessed values between 1986 and 1987 (the 1987 assessments are the base for 1988 tax payments) and ever-increasing property tax rates. The large number of successful rural school referendums in 1986 and 1987 put upward pressure on farm property tax rates. Per acre property taxes during the remainder of the 1980s will result from the interplay of weak certified assessed values, declining at the legislatively set rate of 10 percent per year, and upward pressure on property tax rates driven primarily by rural school taxes.

Per acre property taxes for a sample of Illinois grain farms from 1976 to 1988 are shown in Figure 1a. Data for the sample farms in the 68 northern and central Illinois counties and the 34 southern Illinois counties are also included in Figures 1b and 1c. In 1988, the sample included 1,968 grain farms, totaling 1.53 million acres.

The gap between per acre taxes in southern Illinois and northern and central Illinois continues. The gap is a result of poor-quality soils in southern Illinois counties compared to the other regions of the state, which results in lower assessments, and generally lower farm property tax rates in southern Illinois. The combination of these two factors causes per acre property taxes in southern Illinois to be slightly less than half the average taxes paid in counties in northern and central regions.

The Farm Property Tax Paradox: Has It Disappeared?

The effective property tax rate, which compares property taxes to land values, is one way to measure the property tax burden on Illinois farms. Rates for the last 13 years are shown in Table 1. Between 1981 and 1987, effective rates for Illinois farms increased 114.3 percent (from 0.56 percent to 1.20 percent). This increase reflects slightly lower per acre property taxes and a substantial reduction in Illinois land values. The recent strengthening of land values more than offset the slight increase in per acre property taxes, resulting in a decrease in the effective property tax rate to 1.08 in 1988. The future burden of farm property taxes measured by the effective tax rate will depend on the relative changes in land values and property taxes. If school district property tax pressures increase tax levies at a faster rate than the strengthening of the farm economy and inflationary pressures increase the value of farmland, property tax burdens on the farm sector will resume their familiar upward path.

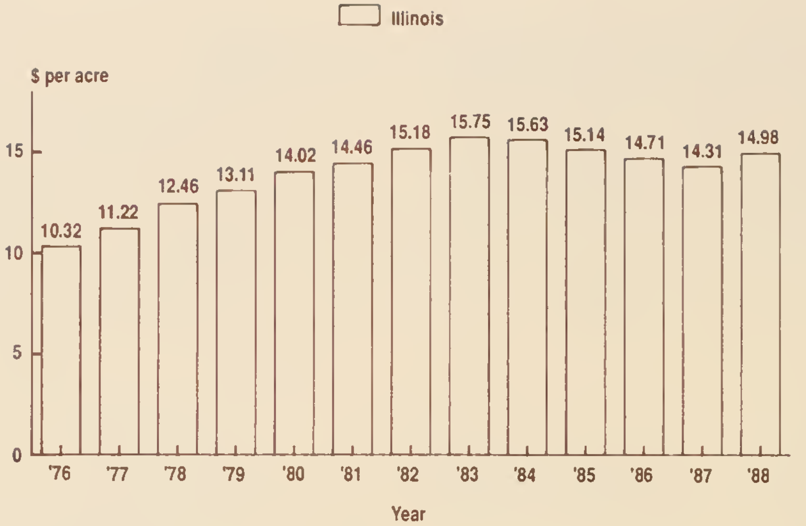


Figure 1a. Per acre property taxes on Illinois grain farms, 1976 to 1988.

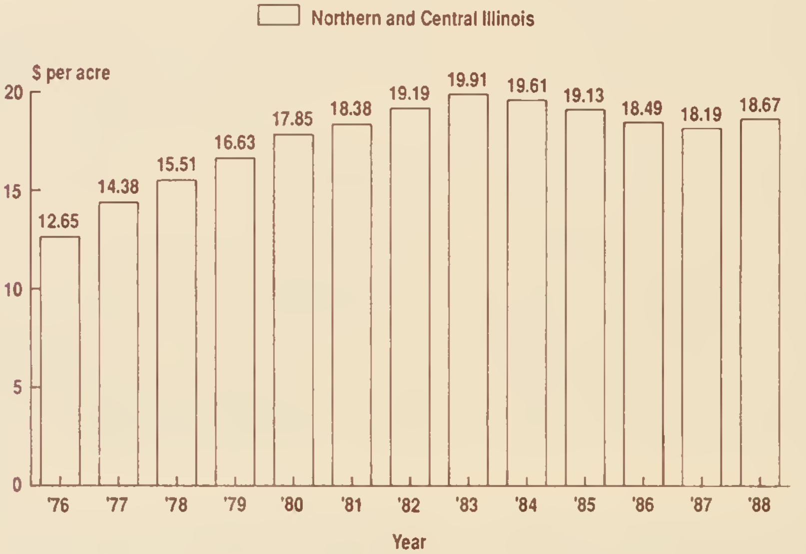


Figure 1b. Per acre property taxes on northern and central Illinois grain farms, 1976 to 1988.

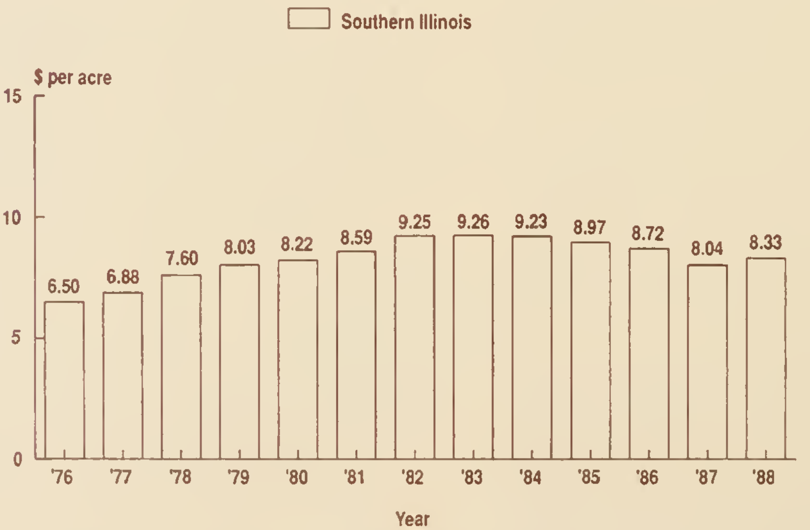


Figure 1c. Per acre property taxes on southern Illinois grain farms, 1976 to 1988.

Table 1. Effective Property Tax Rates on Illinois Farms, 1976 to 1988

	Effective tax rate, percent[a]		
Tax year	Northern Illinois	Southern Illinois	Illinois
1976	1.02	0.88	0.96
1977	0.93	0.75	0.86
1978	0.74	0.62	0.72
1979	0.72	0.59	0.68
1980	0.69	0.54	0.65
1981	0.60	0.49	0.56
1982	0.58	0.51	0.56
1983	0.66	0.56	0.64
1984	0.85	0.72	0.82
1985	0.99	0.84	0.95
1986	1.11	0.94	1.07
1987	1.31	0.92	1.20
1988	1.14	0.89	1.08

[a]The effective tax rate figures property taxes as a percentage of the market value of farmland. Only grain farms were used in making this computation.

The combination of increased per acre property taxes and lower effective tax rates on farmland has reversed the trends of the last several years in 1988 (Figure 2). In 1988, property taxes increased while the burden of the property tax measured with the effective tax rate declined slightly. Prior to 1988 and beginning in 1983, the opposite was occurring: property taxes were declining and property tax burdens were increasing.

Whether the resolution of the paradox will continue into the 1990s is uncertain. A likely future will be the resumption of declining per acre property taxes in 1989 through payment year 1992 or 1993, as increased rural tax rates fail to offset the 10 percent decline in certified farmland assessed value that began in 1988. Movement in the effective tax will depend on movements in land values. With continued strength in the market price for farmland and declining average per acre tax payments, the effective tax rate will likely decline through the rest of the 1980s and for several years in the 1990s. The result will be a relationship not evident in Figure 2—a decline in the index of farm taxes and a decline in the index of effective tax rates.

Summary

The average per acre property taxes paid on Illinois grain farms increased in 1988 for the first time since 1983. This increase, caused by a legislative freeze on certified assessed values in 1987 and higher property tax rates resulting from voter-approved school tax referenda, is not likely to be a permanent reversal of the decline in average per acre taxes that began in 1983. The continuation of declining certified assessed values in 1988 is not likely to be offset by higher tax rates, so the trend of falling average property taxes is expected to continue through 1993 or 1994.

The strengthening of land values in recent years reversed the growth in the farm property tax burden measured by the effective property

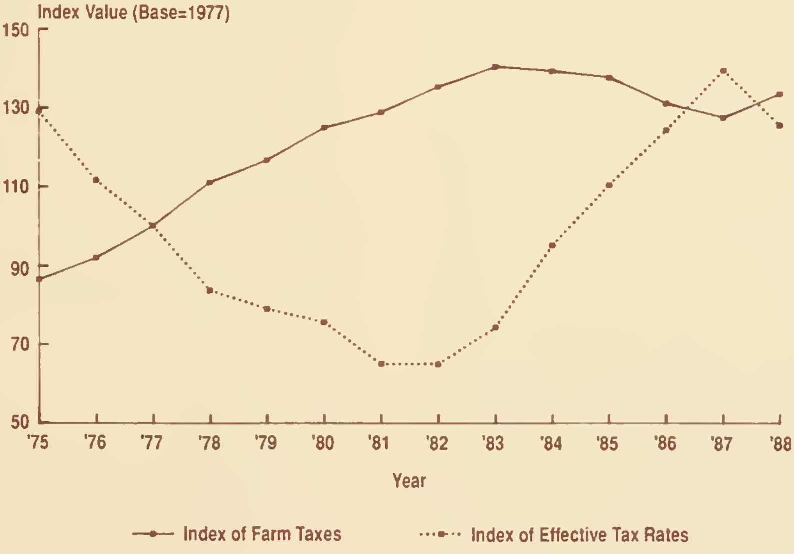


Figure 2. Index of per acre farm property taxes and effective farm property tax rates, 1975 to 1988--the farm property tax paradox.

tax rate. The combination of declining per acre taxes in 1989 and declining effective tax rates because of strength in the land market will solve the farm property tax paradox—declining per acre taxes and an increasing property tax burden on agriculture. The interaction of property tax policies and the performance of the farm economy will usher in a relationship between property taxes and agriculture not experienced before in Illinois—declining average per acre farm taxes and a declining property tax burden evidenced by the effective tax rate.

The interpretation of this relationship for state tax policy is difficult. The relationship is driven more by past farmland assessment policies than by underlying economic conditions. A major influence is the 1986 limitation law, which prevented farmland assessments from dropping more than 10 percent per year beginning in 1988. The law artificially held assessments and thus tax payments above the level warranted by the health of the farm economy and delayed the adjustment of the tax burden to the underlying economic conditions. The economy bottomed out and has begun to rebound, as reflected in stronger land values. The result is that economic forces are moving land values slightly upward, while tax policy is slowly allowing farm tax levels to slip down toward the level dictated by the economy. This situation will cause the unlikely combination of declining per acre tax payments and strengthening land values, thus lowering the tax burden. This perverse relationship is expected to be observed in the 1989 farm tax data. We expect that it will continue to be observed until the limit law is no longer holding assessments artificially high, or until about 1993.

Prepared by:

David L. Chicoine
Extension Economist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-10 *July 1989*

Certified Farmland Values Continue the Ten Percent Downward Trend

Certified farmland assessed values for 1990, which were issued by the Illinois Department of Revenue to county assessing officers in May 1989, continue the decline that reflects the 1986 10 percent limit law. The limit law restricts the change in certified values to 10 percent from one year to the next. A major purpose of the law was to insulate partially the tax bases of rural schools and other local governments from the poorly performing farm economy of the early and mid-1980s by phasing in the assessment decline over several years.

1990 certified assessments by soil-productivity index

Table 1 presents the per-acre certified assessed value of cropland that assessing officers use to determine the 1990 assessed value of farmland throughout Illinois. The cropland indexes range from 60 to 130, and the certified values range from \$8.16 to \$316.61 per acre. After determining the soil index for a tax parcel and the use of the land in farming, the assessor applies the appropriate certified values in calculating the taxable value of the farmland. Farm building, building sites, farm residences, and residential lots are assessed separately and then added to the assessment on the farmland to produce the total assessment on each farm.

The certified values in Table 1 are 90 percent of the values certified in 1989 because the assessed values calculated with the income capitalization formula required by the Illinois Farmland Assessment Law were less than 90 percent of the 1989 values.

The 10 percent limit law required the certification of values that declined by no more than 10 percent from the 1989 certified values.

The income capitalization formula required by the Illinois farmland assessment law is simply represented by:

$$\frac{\text{Gross income per acre less per-acre nonland production costs}}{\text{Average Federal Land Bank mortgage interest rate}}$$

The formula uses 5-year average data to calculate the per-acre assessed value for cropland. Since income and costs vary by soil quality, a separate calculation is done for each soil-productivity index.

Commodity prices are one of the major factors influencing the calculations. The 5-year average prices for the major commodities used in the assessment calculations are presented in Table 2 for each assessment year since the adoption of the Illinois Farmland Assessment Law Amendment of 1981. The 1990 calculation uses crop price averages for the period from 1984 through 1988. For corn, the average price was \$2.32; for soybeans, it was \$6.04. The corn price is slightly lower than the price used for the 1989 calculations; the soybean price is slightly more than the 1989 price. The decline in average prices since the 1986 assessment year reflects economic conditions in farming that have put continuous and drastic downward pressure on the assessment calculations. This downward pressure resulted in the political protection of rural school farmland tax bases through the adoption of the 1986 10 percent limitation law.

Table 1. 1989 and 1990 Certified Farmland Equalized Assessed Values (EAV) by Soil-Productivity Index

Productivity index (average management)[a]	1989 certified EAV (90% of 1988 certified values)	1990 certified EAV (90% of 1989 certified values)	Productivity index (average management)	1989 certified EAV (90% of 1988 certified values)	1990 certified EAV (90% of 1989 certified values)
	dollars per acre			*dollars per acre*	
60	9.07	8.16	96	106.39	95.75
61	9.80	8.82	97	113.00	101.70
62	10.55	9.50	98	119.65	107.69
63	11.28	10.15	99	126.36	113.72
64	12.02	10.82	100	133.11	119.80
65	12.76	11.48	101	139.89	125.90
66	13.50	12.15	102	146.72	132.05
67	14.23	12.81	103	153.59	138.23
68	14.98	13.48	104	160.50	144.45
69	15.88	14.29	105	167.46	150.71
70	16.44	14.80	106	174.63	157.17
71	17.18	15.46	107	182.01	163.81
72	20.31	18.28	108	189.41	170.47
73	23.44	21.10	109	196.79	177.11
74	26.57	23.91	110	204.17	183.75
75	29.69	26.72	111	211.55	190.40
76	32.81	29.53	112	218.93	197.04
77	35.94	32.35	113	226.31	203.68
78	39.06	35.15	114	233.69	210.32
79	42.19	37.97	115	241.07	216.96
80	45.32	40.79	116	248.45	223.61
81	48.44	43.60	117	255.83	230.25
82	51.57	46.41	118	263.21	236.89
83	54.68	49.21	119	270.60	243.54
84	57.82	52.04	120	277.98	250.18
85	60.94	54.85	121	285.36	256.82
86	64.07	57.66	122	292.73	263.46
87	67.19	60.47	123	300.11	270.10
88	70.32	63.29	124	307.50	276.75
89	72.36	65.12	125	314.88	283.39
90	74.38	66.94	126	322.26	290.03
91	79.59	71.63	127	329.64	296.68
92	82.71	75.34	128	337.02	303.32
93	88.07	79.26	129	344.41	309.97
94	93.49	84.14	130	351.79	316.61
95	99.81	89.83			

Source: Illinois Department of Revenue, Certification Memos, 1988 and 1989.

[a]Average management productivity index is the average of the basic and the high-level management indexes as reported in Circular 1156, *Soil Productivity in Illinois*, 1978.

Table 2. Five-Year Average Crop Prices, 1981 to 1988

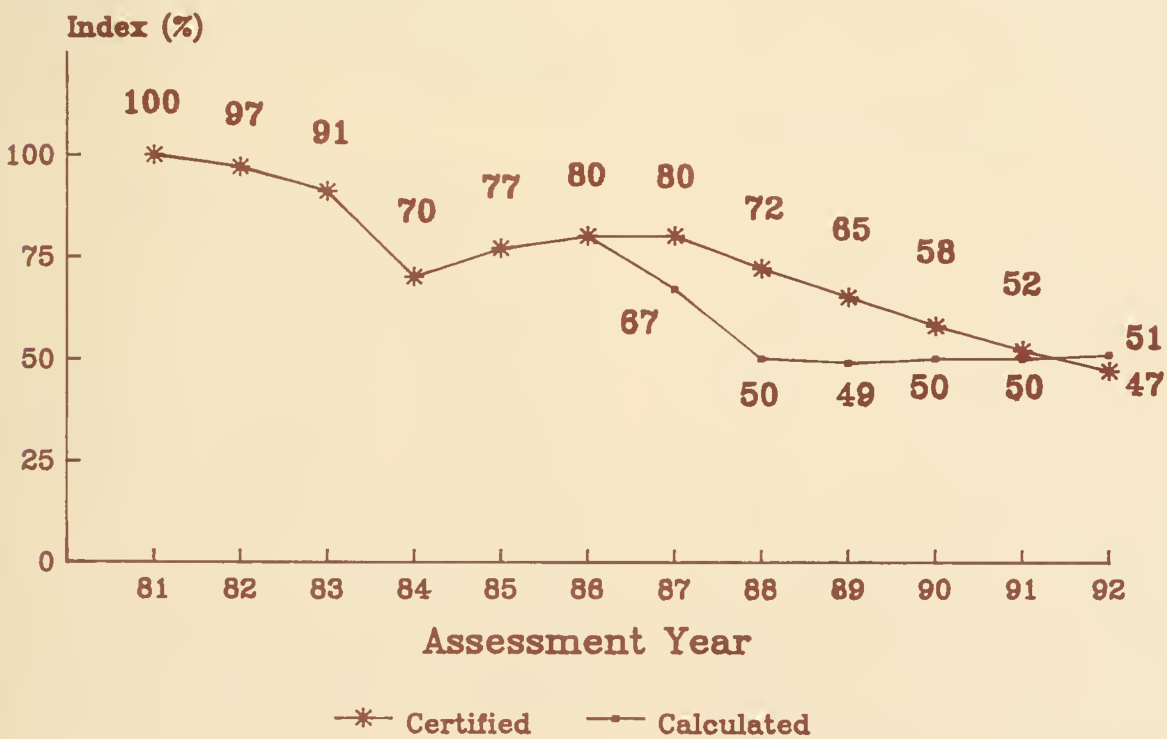
Five-year period	Assessment year	Corn	Soybeans	Wheat	Oats
1976-1980	1982	$2.39	$6.53	$3.17	$1.41
1977-1981	1983	2.48	6.81	3.34	1.52
1978-1982	1984	2.55	6.62	3.52	1.64
1979-1983	1985	2.73	6.73	3.61	1.77
1980-1984	1986	2.87	6.76	3.53	1.85
1981-1985	1987	2.82	6.49	3.36	1.87
1982-1986	1988	2.63	6.10	3.16	1.73
1983-1987	1989	2.46	5.96	3.07	1.68
1984-1988	1990	2.32	6.04	3.08	1.75

Source: Illinois Crop Reporting Service.

In addition to the average commodity price, the calculation includes nonland production costs and the average Federal Land Bank mortgage interest rate. In combination, these factors result in the movement of the calculated assessed values for each soil-productivity index. Since 1986, the result of the calculations would have lowered values more than 10 percent, so in each year beginning in 1988, certified values were restricted to 90 percent of the previous year's certified values.

Farmland assessments in the 1990s

With the recent strengthening of the farm economy, assisted significantly by federal price supports, calculated assessed values have become more stable, allowing the declining certified assessed values to "catch up" with the calculated values. This catch-up can be seen in the figure, where the certified and the calculated assessed values for a soil with a 120 soil-productivity index are presented as an index. Before the 1986 assessments, the



Index of certified and calculated assessed values for soils with a productivity index of 120, 1981 to 1989, with projections to 1992.

calculated and certified values were the same. The 1986 limit law required the use of 1986 certified values for both 1986 and 1987 assessments and then restricted the change to 10 percent per year. The top line in the figure is the certified values though 1990 with a projection through 1992. The lower line similarly traces the calculated values.

The calculated value for the 120 soil index in 1990 was $215 per acre, up slightly from the 1989 calculated value of $212 per acre. This figure is reflected in the calculated index's moving up from 49 to 50 between the 1989 and 1990 assessments. Forecasts for 1991 and 1992 calculated assessments are for stable calculated values.

Comparing the certified value trend with the calculated one indicates that the 1992 certified assessed values (certified in May 1991) will be based on actual calculations and not a result of the 10 percent limit law. The lower farm assessments resulting from the poor performance of the farm economy that began in the 1980s will have been completely integrated into the farm property tax base in 1992. This assessment will be the base for property tax bills paid in 1993 and the property tax revenues supporting the 1993-94 budgets of rural school district. Assessments on farmland would be expected to stabilize at about 50 percent of the level that existed at the beginning of the 1980s. This figure is consistent with the percent of decline in the market price for farmland during the decade.

While the stabilization of farmland assessments in 1992 will be welcome news to rural school officials, the farm property tax base will likely stabilize at such a level that the rural economy will incur a substantial loss in its taxing capacity. With a likely 50 percent loss in tax capacity, property tax rates on farms would have to increase 50 percent by the early 1990s just to maintain the *nominal* dollars collected from the farm sector supporting rural schools. Such tax rate increases are not at all likely to receive voter approval. The challenge of financing rural education will follow us into the 1990s and be a persistent focus for state policy even after the farmland property tax base has stabilized and once again reflects the economic conditions in Illinois agriculture.

Farm property taxes and farm income

A common measure of tax level used to compare conditions among states is the taxes paid per $1,000 of personal income. Property taxes per $1,000 of personal income for the Illinois economy and Illinois agriculture were calculated using personal income information for Illinois and Illinois agriculture and property tax extensions in total and property tax extensions on farm property. The ratios for the last four 5-year periods are presented in Table 3. Five-year averages are used because of the dramatic year-to-year swings in income that are characteristic of agriculture. The averages are more comparable with the entire economy in which personal income is much more stable from year to year.

For the 5-year period from 1983 to 1987 for Illinois, $36.02 was paid in property taxes for each $1,000 of personal income. For Illinois agriculture, the amount was $334.59 for each $1,000 in farm personal income. The good news for the farm sector is that this figure is down from a high of $404.13 per $1,000 in personal income in the period from 1980 to 1984. The decline in the ratio is a result of strengthened farm income during the decade and limited declines in property tax extensions on farm property. However, this ratio for farming is still about 10 times larger than the ratio for the Illinois economy.

Table 3. Illinois Property Tax Receipts per $1,000 of Personal Income

Selected 5-year periods	All sectors	Farm sector
1980-1984	$36.31	$404.13
1981-1985	$36.38	$347.50
1982-1986	$36.26	$373.59
1983-1987	$36.02	$334.59

Sources: Income data from the Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce. Property tax information from *Illinois Property Tax Statistics*, Department of Revenue, Springfield, Illinois. Property taxes are for the payment year.

Two major reasons for the difference in the higher ratio for agriculture are the significantly heavier use of real assets, that is, farmland, in the agricultural sector relative to the entire economy of Illinois and the heavy dependence on this asset base in rural regions to finance rural schools. Achieving more balance between agriculture and the entire economy in property tax per $1,000 of personal income can only be addressed through changes in the policy for rural school finance and a shift away from farm property taxes as the base for funding rural education. This shift, of course, would require a tax swap and the replacement of farm property taxes with another revenue source, such as distributed state income tax receipts.

The 1990 certified farmland assessed values continue to reflect the 1986 10 percent limit law and not the underlying economic conditions of the farm sector. A decline of 10 percent per year is expected in 1991, with 1992 certified values based on calculated values. In 1992, the weak farming economy of the 1980s will have been completely absorbed into the Illinois farm property tax base. From that year on, certified values and consequently the Illinois property tax base will reflect the economic performance of the farm economy, but within the limitations of the 10 percent law. The certified values for 1992 are expected to be one-half of the certified values of 1981, reflecting the universal reduction of 50 percent in the market value of farmland since the peak periods of the early 1980s.

The farm sector pays about ten times more property taxes than does Illinois as a whole when taxes are compared to personal income. This difference is caused by the heavy reliance on real property by agriculture in the production of crops in comparison to the state's economy and the significant reliance of rural schools on the property tax for funding. Only major shifts in rural school finance away from the property tax will provide more balance in the relationship between property taxes and income.

Prepared by:

David L. Chicoine
Extension Economist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

1
9

FARM ECONOMICS
Facts & Opinions

Cooperative Extension Service

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-11 *September 1989*

Economics of Phosphorus and Potassium Applications

Economic decisions regarding annual application rates for phosphorus (P) and potassium (K) differ from those for nitrogen and other chemical inputs. Nitrogen application rates are based upon the nutrient needs of the next crop to be grown. Phosphorus and potassium usually remain in the soil unless they are removed by a growing crop or by erosion.

Traditionally, Illinois fertilizer specialists recommend establishing a base soil test, then adding enough P and K fertilizer to support the yield of the most demanding crop and replace what that crop removes.

P and K fertilizer are usually inexpensive enough to justify investment in a four-year buildup program. The yield response is very high at low P and K test levels but diminishes at higher test levels (Tables 1 and 2). Data for Tables 1 and 2 are taken from Figures 17 and 18 in the *1989-1990 Illinois Agronomy Handbook* (University of Illinois Cooperative Extension Service Circular 1290, pp. 54-55). These examples are for soils in southern Illinois with low phosphorus-supplying power and low cation-exchange capacity (CEC) as depicted in Figures 15 and 16 in the Agronomy Handbook. Data for other soils in Illinois are included in the worksheets in Tables 3 and 4.

In the following examples, recommendations are based on targeted corn and soybean yields of 120 and 40 bushels per acre, respectively.

In making economic decisions regarding fertilizer applications, it is important to use an appropriate target yield for each crop and field. A target yield should not be the highest yield for the particular field or farm because weather variation is also a factor. Rather, the target yield should be based on the average crop yield during recent years on the particular field, plus a realistic increase on the average yield.

Average yields for a sample of Farm Business Farm Management (FBFM) farms in southern Illinois from 1982 to 1987 were 115.6 and 36.4 bushels per acre for corn and soybeans, respectively. This sample of farms had soil ratings greater than 60.0 and averaging 64.11.

On low phosphorus-supplying soils, corn yield increased 7 percent as P_1 test levels increased from 30 to 40. However, from 60 to 70 P_1, the yield increase was only 1 percent. The average corn yield increase is enough to recover the amortized investment cost in four years or more, up to a 50 to 60 P_1 test level only for corn prices above $3.00 per bushel. Current prices for soybeans will also cover the costs of increasing the P_1 test level to 50. Even low prices for wheat will support increasing phosphorus levels to 60.

Similarly, in Table 2, with $2.75 corn, the value of the expected yield increase exceeds the four-year amortization payment required on the initial potassium buildup, until 200 K is reached. For soybeans and wheat, K test levels are justified up to 160 and 120,

STATE• COUNTY •LOCAL GROUPS •U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

respectively. The payoff period is more than four years for higher test levels of both P and K. Many producers face limits on borrowed funds available for production expenses. With limited working capital, producers should examine alternative levels of P and K.

Worksheets

Tables 3 and 4 are worksheets for calculating your break-even test levels of P and K. Make one photocopy of the worksheets for each crop. To calculate break-even levels for different crops and soils, use the following procedures:

Line

1a Enter the crop you wish to evaluate (corn, soybeans, or small grains).
1b Enter the potential or target yield for the selected crop on the selected field.
2a Enter the net price for the crop (market price less yield-related variable costs).
2b Enter the cost of the fertilizer.
3 Incremental changes in the test levels are provided.
4 This line provides the pounds of fertilizer required to change the test level by the amount indicated in line 3.
5 Multiply the price of fertilizer in line 2b by each level of application in line 4.
6 Multiply the dollar-per-acre values in line 5 by 0.315 to estimate the annual four-year amortized cost, at 10 percent interest, of applying the fertilizer. Annual costs for other interest rates or amortization periods can be computed by replacing 0.315 with the appropriate amortization factor.
7a This section contains percentage yield-increase data by crop for low P-supplying soils or low CEC soils.
7b This section contains percentage yield-increase data by crop for high P-supplying soils or high CEC soils.
8 Calculate the bushel-per-acre increase in crop yield by multiplying the appropriate values for your soil type and crop in sections 7a or 7b by the potential crop yield in line 1b; then divide by 100.
9 Divide the values in line 6 by the net market price in line 2a.
10 If the value in line 8 is greater than the value in line 9, you can justify a fertilizer buildup to the amount shown in line 10.

Summary

Optimum fertilizer rates are determined by equating the value of the increased yield of the crop to the cost of the additional fertilizers. When capital is limited, the return for each additional dollar invested in fertilizer must be equal to or greater than its potential return in alternative investments. A change in the ratio of commodity prices to fertilizer costs, with everything else held constant, changes the optimum levels of fertilizer.

The decision to apply P and K in any amount depends on the difference in yield responses and on alternative returns for the scarce operating dollars required for the fertilizer. If the producer could maintain yields with no additional P and K fertilizer, that option is more profitable in the short run.

Prepared by:

Robert H. Hornbaker
Extension Economist
Farm Management

Issued by:

Robert H. Hornbaker

Table 1. Economics of Phosphorus (P) Buildup in Low-Supplying Soils

	Change in P_1 test level			
	30 to 40	40 to 50	50 to 60	60 to 70
Buildup quantity of P_2O_5 required (lb/A)	90	90	90	90
Investment cost at $0.22/lb	$19.80	$19.80	$19.80	$19.80
	percent of potential			
Base yield of crop				
Corn	87	94	97	99
Soybeans	88	96	99	100
Small grains	56	71	85	92
Expected yield after buildup				
Corn	94	97	99	100
Soybeans	96	99	100	100
Small grains	71	85	92	95
Marginal increase in yields				
Corn	7	3	2	1
Soybeans	8	3	1	0
Small grains	15	14	7	3
Years to reach buildup level of yield	4	4	4	4
	bushels			
Average yield increase per acre				
Corn (120-bu potential)	8.4	3.6	2.4	1.2
Soybeans (40-bu potential)	3.2	1.2	0.4	0.0
Wheat (50-bu potential)	7.5	7.0	3.5	1.5
Annual four-year amortized cost per acre of buildup fertilizer investment at 10 percent interest	$6.25	$6.25	$6.25	$6.25
	bushels[b]			
Break-even increase in yield of crop				
Corn at $3.50 (3.05)[a]	2.05	2.05	2.05	2.05
2.75 (2.30)	2.71	2.71	2.71	2.71
2.00 (1.55)	4.03	4.03	4.03	4.03
Soybeans at $8.25 (7.70)	0.81	0.81	0.81	0.81
7.25 (6.70)	0.93	0.93	0.93	0.93
6.25 (5.70)	1.10	1.10	1.10	1.10
Wheat at $4.25 (3.80)	1.64	1.64	1.64	1.64
3.50 (3.05)	2.05	2.05	2.05	2.05
2.75 (2.30)	2.71	2.71	2.71	2.71

[a]Net price equals market price less yield-related variable cash costs of maintenance fertilizer, harvesting, drying, storage, and marketing.
[b]The boxed area represents the test levels of phosphorus where the value of the increase in yield exceeds the four-year amortized cost.

Table 2. Economics of Potassium (K) Buildup in Low CEC Soils

	Change in K test level				
	120 to 160	160 to 200	200 to 240	240 to 280	280 to 320
Buildup quantity of K_2O required (lb/acre)	160	160	160	160	160
Investment cost at $0.125/lb	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00
	percent of potential				
Base yield of crop					
Corn	85	92	95	97	98
Soybeans	88	95	97	98	99
Small grains	96	98	99	100	100
Expected yield after buildup					
Corn	92	95	97	98	98
Soybeans	95	97	98	99	99
Small grains	98	99	100	100	100
Marginal increase in yield					
Corn	7	3	2	1	0
Soybeans	7	2	1	1	0
Small grains	2	1	1	0	0
Years to reach buildup level of yield	4	4	4	4	4
Average yield increase per acre	*bushels*				
Corn (120-bu potential)	8.4	3.6	2.4	1.2	0.0
Soybeans (40-bu potential)	2.8	0.8	0.4	0.4	0.0
Wheat (50-bu potential)	1.0	0.5	0.5	0.0	0.0
Annual four-year amortized cost per acre of buildup fertilizer investment at 10 percent interest	$ 6.31	$ 6.31	$ 6.31	$ 6.31	$ 6.31
Break-even increase in yield of crop	*bushels*[b]				
Corn at $3.50 (3.05)[a]	2.07	2.07	2.07	2.07	2.07
2.75 (2.30)	2.74	2.74	2.74	2.74	2.74
2.00 (1.55)	4.07	4.07	4.07	4.07	4.07
Soybeans at $8.25 (7.70)	0.82	0.82	0.82	0.82	0.82
7.25 (6.70)	0.94	0.94	0.94	0.94	0.94
6.25 (5.70)	1.11	1.11	1.11	1.11	1.11
Wheat at $4.25 (3.80)	1.66	1.66	1.66	1.66	1.66
3.50 (3.05)	2.00	2.00	2.00	2.00	2.00
2.75 (2.30)	2.74	2.74	2.74	2.74	2.74

[a]Net price equals market price less yield-related variable cash costs of maintenance fertilizer, harvesting, drying, storage, and marketing.
[b]The boxed area represents the test levels of potassium where the value of the increase in yield exceeds the four-year amortized cost.

Table 3. Worksheet for Phosphorus

1a Crop ______________________ 1b Potential yield (bu/A) ______________________

2a Net market price ($/bu) __________ 2b Price of P_2O_5 ($/lb) ______________________

	Change in P_1 test level			
3	30 to 40	40 to 50	50 to 60	60 to 70
4 Buildup quantity of P_2O_5 required (lb/A)	90	90	90	90
5 Investment cost (multiply line 2b by line 4)	_____	_____	_____	_____
6 Annual four-year cost at 10 percent interest (line 5 x 0.315)	_____	_____	_____	_____
Marginal increase in yields	*percent of potential*			
7a Low P-supplying soils				
Corn	7	3	2	1
Soybeans	8	3	1	0
Small grains	15	14	7	3
7b High P-supplying soils				
Corn	3	2	1	0
Soybeans	3	1	0	0
Small grains	14	7	3	1
8 Yield increase (line 1b x values in 7a or 7b ÷ 100)	_____	_____	_____	_____
9 Break-even increase in yield (line 6 ÷ 2a)	_____	_____	_____	_____
10 If line 8 is greater than line 9, build up P_1 test to:	*lb/A*			
	40	50	60	70

Table 4. Worksheet for Potassium

1a Crop ______________________ 1b Potential yield (bu/A) ______________________

2a Net market price ($/bu) ________ 2b Price of K_2O ($/lb) ______________________

	Change in K test level				
3	120 to 160	160 to 200	200 to 240	240 to 280	280 to 320
4 Buildup quantity of K_2O required (lb/A)	160	160	160	160	160
5 Investment cost (multiply line 2b by line 4)	____	____	____	____	____
6 Annual four-year cost at 10 percent interest (line 5 x 0.315)	____	____	____	____	____
Marginal increase in yields	*percent of potential*				
7a Low CEC soils					
Corn	7	3	2	1	0
Soybeans	7	2	1	1	0
Small grains	2	1	1	0	0
7b High CEC soils					
Corn	8	7	3	2	1
Soybeans	7	7	2	1	1
Small grains	4	2	1	1	0
8 Yield increase (line 1b x values in 7a or 7b ÷ 100)	____	____	____	____	____
9 Break-even increase in yield (line 6 ÷ 2a)	____	____	____	____	____
10 If line 8 is greater than line 9, build up K test to:	*lb/A*				
	160	200	240	280	320

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-12 *October 1989*

Illinois Farmers' Preferences for the 1990 Farm Bill

The Food Security Act of 1985 expires at the end of the 1990 crop season. Public hearings and discussion about the next major agricultural and food legislation are now underway. Illinois farmers agree on some issues, but are divided on others. By understanding Illinois farmers' preferences on the major issues, farm organizations and groups can build coalitions and bridges with other groups to achieve similar policy goals.

During January and February 1989, 1,000 randomly selected Illinois farmers were asked their preferences on policy issues to be discussed as Congress writes the 1990 farm bill. Farmers who did not respond by mail were telephoned. This report is based upon responses from 592 farmers.

Commodity Programs

Commodity programs are a major part of the 1985 Food Security Act, and will be an important part of the 1990 legislation as well.

Preferred Price Support Policy. While 39 percent of farmers who responded preferred to keep present programs, 38 percent wanted to gradually eliminate all price support programs. Only 8 percent favored mandatory supply control, and 9 percent preferred decoupling of production requirements from program payments. Half of those with over $500,000 gross sales preferred to keep the present program. The strongest support for decoupling came from those with gross sales over $100,000.

Target Prices. A majority of farmers wanted to keep target prices. More favored increased target prices than current or reduced prices.

Loan Rates. Although 39 percent preferred to base loans on the average market price as provided in the 1985 act, 34 percent preferred to eliminate commodity loans and 19 percent wanted to increase loan rates. The strongest support for basing loan rates on average market prices and the least support for phasing out the loan program came from those with annual sales over $250,000.

Paid Diversion. A majority favored paid acreage diversion for the secretary of agriculture to use when needed. Those with annual gross sales over $40,000 expressed the most support for this program.

Marketing Loans for Wheat, Feed Grains, and Soybeans. The marketing loan would enable farmers to repay their government commodity loans at the market price if this price was below the loan rate. Illinois farmers were about equally divided among those in favor, those opposed, and those not sure. However, farmers with gross sales over $500,000 favored the marketing loan.

Acreage Bases. More farmers preferred a total crop acreage base for their farm to the specific crop bases now in use. Such bases would allow more flexibility in making cropping decisions. The Disaster Assistance Acts of 1988 and 1989, which permit substitution of soybean planting on corn-base acreage, are a move toward the more flexible crop base.

PIK Certificates. Illinois farmers have learned to use the generic commodity certificates issued by USDA after passage of the 1985 act. More farmers favored than opposed continuation of PIK (payment in kind) certificates, although about one in five was not sure. PIK certificates were most favored by farmers under 50 years of age and by those with over $250,000 gross sales.

Farmer-Owned Reserve. More farmers wanted to see the farmer-owned reserve continued rather than discontinued, but more than one in four was not sure. A majority of those with sales over $100,000 favored continuation.

Discretion for the Secretary of Agriculture. In all major farm legislation the secretary of agriculture has been authorized to make certain decisions to administer the price and income support programs. Nearly half of the farmers preferred no change in the amount of discretion given to the secretary of agriculture to make farm program decisions. Others were divided between giving the secretary more or less discretion.

More Support for Smaller Farms. A majority agreed that future farm programs should be changed to give a higher proportion of price and income support benefits to farmers with gross annual sales of less than $250,000. Farmers under 50 years of age were more in favor of giving increased support to smaller farm operations. However, the farmers did not believe that farm programs should influence the number and size of farms.

Future Dairy Policy. Farmers were divided on whether to continue the present program, phase it out, set up production quotas, or give the secretary of agriculture more control. Among dairy farmers, 38 percent wanted to keep the present program, 29 percent wanted a production quota, 26 percent wanted to phase it out, and the rest were uncertain or did not reply.

Cutting Farm Program Costs. If reductions were required to reduce federal spending, farmers would have two major preferences. About 40 percent would want to see reductions in the large payments, while 33 percent would prefer across-the-board percentage cuts. The least popular options were to cut some programs more than others or to make payments based only on financial need. Farmers under 35 tended to favor payments based on financial need more than did older farmers. Those with gross sales over $250,000 most strongly favored across-the-board cuts and opposed cutting large payments.

Conservation Programs

The 1985 act brought major changes in conservation requirements for farmers who wanted to remain eligible for farm program benefits.

Conservation Plans. About two out of three farmers favored the conservation plan requirements to qualify for farm program benefits.

Conservation Reserve Program. Farmers strongly supported the conservation reserve program established in the 1985 Food Security Act. However, they were divided as to whether to keep the acreage at 30 million, expand to 45 million, or further expand to 60 million.

Improving Soil Conservation and Water Quality. When farmers were given a list of choices, they most favored cost sharing for conservation and water structures and payments to modify cultural practices.

Regulating Land Use to Reduce Water Pollution. A majority of farmers believed that government should regulate certain farming practices and land uses to reduce pollution of underground and stream water.

Other Issues

Crop Insurance. The 1988 drought has made crop insurance a major issue. Despite limited participation in the crop insurance program, 42 percent of the farmers preferred to keep the present insurance program. A majority of those with over

$100,000 gross sales wanted to keep it, while farmers over 65 were less satisfied with the current insurance program. Those who did not want to keep the present program were about evenly divided between receiving direct drought assistance in years of severe natural disturbances; requiring all farmers to buy crop insurance; eliminating all disaster payments and crop insurance; and those who were not sure.

Payment Limit. There is now a $50,000 limit (with exceptions) on direct price support payments. Half of all respondents preferred to see no change. Others were divided between increasing, decreasing, and eliminating the limit. A majority of those with over $250,000 in sales favored either raising the limit or eliminating it.

Credit to High Risk Farmers. Farmers were divided on whether the government should continue to loan money to farmers with limited capital who cannot get credit from other sources. About one-third said yes, one-third said no, and the remainder were not sure or did not respond. Those with gross sales over $500,000 opposed government credit to high risk farmers.

Agricultural Trade and Development

Since Illinois farmers sell their products in a global market, trade policies have a major influence on farm programs and farm prices.

Reducing Trade Barriers. About four out of five Illinois farmers who responded favored negotiating worldwide reductions in trade barriers.

Bilateral Agreements. A majority favored separate trade agreements between the United States and individual countries.

Reducing Domestic Farm Subsidies. A majority favored negotiations to reduce domestic farm subsidies of major importing and exporting countries worldwide. Farmers under 50 showed more support for those reductions than did older farmers.

More Food Aid to Hungry Nations. More farmers favored than opposed sending additional food aid to hungry nations, but many were not sure about this policy. Farmers under 50 supported food aid more than did older operators.

Farmer-Financed Market Development. A majority favored additional farmer-financed market development programs. Respondents between 35 and 64 were more supportive than younger or older operators. Those with gross sales under $40,000 showed the least support.

International Agreements. Farmers were divided on whether the United States should join with other major exporting countries to establish production and marketing controls. A majority of respondents over 65 favored this proposal. However, those with over $100,000 gross sales were generally opposed.

Export Enhancement. A majority favored continuing the export enhancement program that was established by the 1985 act. Farmers under 50 and with gross sales over $40,000 were more supportive of this program than were others.

Reducing Import Barriers to Enhance Trade. More farmers favored than opposed reducing agricultural import barriers to encourage more total trade. But a significant amount of uncertainty was also evident. Those with gross sales between $100,000 and $500,000 were least supportive of this idea. Farmers were divided on the question of giving selected low-income countries preferred entry into our U.S. agricultural market.

Helping Developing Countries Increase Their Productivity. More farmers opposed than favored helping developing countries increase their agricultural productivity and trade potential. However, half of those with sales over $500,000 supported this idea.

Survey Profile

Farmers of all ages were represented in the sample. Over half had sales between $40,000 and $250,000 annually. About 44 percent had graduated from high school, and another 36 percent had graduated from or attended college. About two out of three families reported income from off-farm employment.

The major sources of farm income were from grain, livestock, and mixed grain and livestock. About three out of four participated in the 1988 feed grain program, one in five in the wheat program, one in ten in the Conservation Reserve program, and half in the 1988 disaster program.

Acknowledgement

A special note of appreciation is due to Fred Barrett and Gary Kepley at the Illinois Agricultural Statistics Service for their assistance in drawing the sample, laying out and mailing the questionnaire, and supervising the phone interviews. Robert G.F. Spitze, professor of agricultural economics, assisted in developing the questionnaire and Alexander Amuah, research assistant, in data tabulation and analysis.

Prepared by :

Harold D. Guither
Extension Economist
Public Policy

Issued by:

Harold Guither

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-13 *October 1989*

Land Values: A Look Ahead

The consensus of opinion among professional appraisers on our most recent survey of farmland prices in Illinois was that prices for better-quality land had gone up this past year by 10.4 percent and that land of above-average quality is expected to go up in price by 5.8 percent next year. At current prices, this increase would be about $115 per acre. The same group reported that prices for land of below-average quality increased by 5.5 percent in the past year and are predicted to increase next year by 3.8 percent.

We have been conducting this survey for a number of years, and I think it is one of the few that ask for forecasts: Most merely ask what happened. A review of our surveys gives some interesting insights. For instance, predictions by a group of experts usually follow an established trend. Because last year was an "up" year, it is the pattern to forecast a continuation of that upswing into the coming year.

Indeed, next year is being predicted as an "up" year, but the prediction is cautious—forecasting a smaller increase than last year. The same forecasting pattern seems to be true on the downside when the consensus forecasts lower prices—that is, predicting a smaller decline than experienced the previous year. When the trend does continue, the prediction has always been an underestimate of what actually happens. So if land prices go up, they go up more than forecast; and if they go down, they go down more than forecast. One of the most poorly predicted aspects, at least in our land-price surveys, is the turning point. Professionals as a group do not predict a downturn or an upturn in the market—they predict the continuation of an existing trend. That is not to say that some experts are not omniscient, and do predict a reversal of the trend.

As usual, a number of opposing factors are working in the market. The negative factors for land prices include (1) a commodity supply rebound from the drought; (2) a long-term increase in supply relative to demand, generated by technological improvements, education, and better management; (3) a decline in government payments; and (4) a new generation of farmers, more knowledgeable about financial management and alternative-asset and human-capital returns and who are less emotionally tied to farming.

This "new generation" factor, I believe, will cause more change in Midwest farming than any other single factor on the horizon. The major effect will be to reduce asset values (particularly land); to sever labor and management from asset ownership of real estate and (to some extent) equipment; and to raise the level of returns to labor and management. Government payments have reached unprecedented levels. For example, total direct payments in Illinois increased from a low in 1980 of a few dollars per acre to $30 in 1986, $50 in 1987, and $46 in 1988. With the fiscal problems of the government and the fact that reductions in target prices are already legislated, direct payments are likely to decline significantly, which will affect the income available to make mortgage payments and, consequently, will affect land values.

The factors that will tend to push land prices up include (1) reduced supply in the market, now that most of the land lost through foreclosure or bankruptcy has been liquidated; (2) lower mortgage interest rates; and (3) additional outside investment.

In most counties, the normal turnover rate of land, the proportion of all farmland that is sold each year, is less than 5 percent, making the normal supply relatively small. However, we have gone through a period when foreclosures increased the normal supply. Much of the land purchased in the last two or three years was bought with cash and is now in the hands of financially strong owners. That land will not be coming back on the market soon, which will tend to keep land prices at a higher level.

Interest rates, of course, do make a difference. For example, if a net return per acre of $60 can be used for mortgage payment and if interest rates decline from 12 to 10 percent, the amount of mortgage that can be funded rises from about $480 to $570 per acre (including an amortized payment on principle): This means that the same income will support a higher land price of about $100 per acre. Clearly, if the net rent applicable to payments is larger, then the interest decline will support an even higher price for land.

Everyone can make his or her own judgment as to which set of factors may be the stronger over the next few years. I believe the negative factors are becoming stronger. The stage is being set for a new decline in land prices, although much kinder and gentler than the last decline. The decline may not begin this year or even next year, it will be more gradual, and it will not be as deep as the last decline.

Two conditions could turn this prediction around: (1) more persistent and higher inflation than expected, with a continuing large federal deficit; and (2) a dive into the land market by the people with megabucks (the Japanese) after they buy up other desirable U.S. real estate that they are more knowledgeable about, such as office buildings, shopping centers, and factories.

Renewed and persistent inflation does not appear to be a threat at this time. The Federal Reserve is dedicated to holding inflation at a low level and may be sufficiently independent of politics to be successful.

The greatest defense against the buying up of our assets—real estate as well as factories, companies, and stocks and bonds—by the Japanese is to get serious about closing the trade gap. Almost half our trade deficit is with Japan. That trade deficit has been running $50 billion per year. Some states have laws discouraging foreign ownership of farmland. Economists, such as myself, who were educated under the free-trade theories and free movement of both goods and capital are against such restrictive laws, because they reduce freedom and eventually lower the general welfare.

Prepared by:

John T. Scott, Jr.
Extension Specialist, Land Economics
and Farm Management

Issued by:

John T. Scott, Jr.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-14 *October 1989*

Records Show that Cash-Rent Returns Are Higher in 1988 than Crop-Share Returns

A summary of information from the Illinois Farm Business Record Associations on land rents for 1988 finds that cash rents paid were generally $3 to $4 per acre higher than in 1987. Table 1 shows the average cash rents that are paid, depending on type of farm and area of the state. The sample is not large, but it has been thoroughly screened and we have a fair amount of confidence in the numbers. We do know from the data and other reports that the range in rents is large. On farms with Soil Productivity Ratings between 86 and 100, the range is generally from $80 to $150 per acre with very few above $135. The higher per-acre cash rents are likely to include rent on buildings that are of use and value to the tenant or for other special improvements. Taxes comprise the largest cost in a rent payment.

The past year was one of the few in which net income to landowners renting their land on a share basis fell below the net produced for the landowners with cash leases. The share rent depends primarily on yields and prices. While prices in 1988 were excellent, the yields were the lowest experienced for many years because of the drought. Prices only partially offset the low yields. On a current return basis, this situation produced a higher rate of return on cash leases than on share leases, as shown in Tables 2a and 2b.

The return on investment for share renters ranged from 2.72 percent up to 3.41 percent depending on the group, whereas the cash-rent rate earned ranged from a low of 2.49 percent to a high of 5.37 percent, with most above 4 percent. Landowner investment ranged from a low of $1,350 per acre on dairy farms to a high of about $1,900 per acre on some of the high-quality grain farms in northern and central Illinois and from about $800 to $1,200 per acre in southern Illinois. The investment return earned in southern Illinois was higher, ranging from about 3.5 percent to 7.5 percent. Land quality and the proportion of land that is tillable are the main reasons for the significant difference in return. Dairy farmers, of course, would have more invested in farm buildings than grain farmers.

We continue to strongly recommend the share lease because we think it is more fair over the years than most other lease forms:

(1) It shares the risk of both price and yield equally between the tenant and the landlord, and

(2) It is self-adjusting from one year to the next because the return automatically adjusts with technological improvement in yields and with trends.

The lease does not have to be renegotiated each year. This leads to longer tenure for the farm operator, which is good for community stability and generally good for the farm, with the operator taking a longer-term view toward investment in machinery and new technology, conservation, and environmental concerns.

Our records show that the number of crop-share leases has been declining. The latest statistics show that 68 percent of all leases

STATE • COUNTY • LOCAL GROUPS • U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

are crop-share leases, with 4 percent livestock share and 28 percent cash rent. Cash-rent leases have been increasing and in many cases, these leases are more convenient for both parties: for the farm operator when he is farming many scattered tracts of varying size, and for the landowner who may have limited knowledge about current production technology or does not want to be bothered with the extra accounting or marketing decisions required with the share lease.

Despite the drought in 1988, there was little, if any, decline in cash rents in 1989. Some negotiated leases were higher based on the expectations of a normal crop and the early sale of crops at very good prices.

The outlook for 1990 on cash rent seems to be strong, with many landowners seeking, and, in some cases, successfully negotiating about a 5 percent higher cash rent. According to our budgets, 170 bushels of corn and 45 bushels of beans at moderate to good prices would net about $120 per acre for the 50-50 share-lease landowner. We might expect cash rents to be slightly higher than this to cover taxes and other minor landowner expenses on some of the top-quality farms. We would expect the net cash rent to be less than crop-share rent because the risk is shifted entirely to the farm operator and payment of cash rent is made before crops are sold.

Environmental legislation has imposed new liabilities on landowners. Landowners will need to attest to the absence of environmental hazards on the property when it is transferred or sold. This means that provisions in the lease will be needed on the levels, application, and disposition of excess wastes or containers of chemicals used on the farm. Monitoring is important. Custom application by licensed applicators may be one way of shifting the liability.

Prepared by:

John T. Scott, Jr.
Extension economist and Professor,
Land Economics and
Farm Management

Issued by:

John T. Scott, Jr.

John T. Scott, Jr.

Table 1. Gross Cash Rent Paid per Tillable Acre

	Soil Productivity Rating	Part-owner	Full tenant
		Cash rent	
Northern and central Illinois farms			
Grain	(86-100)	$ 96	$ 98
Grain	(56-85)	86	78
Hog	(56-100)	97	104
Dairy	(Ave. 71)	86	96
Beef	(Ave. 79)	85	94
Southern Illinois farms			
Grain	(36-85)	$ 54	$ 67
Hog	(36-85)	81	--*
Dairy	(36-85)	59	71
Beef	(36-85)	43	68

*Insufficient data

Table 2a. Net Incomes per Tillable Acre for Northern and Central Illinois Landowners, with Investment and Rate Earned by Type of Farm and Lease

	Soil Productivity Rating	Part-owner			Full tenant		
		Net income[a]	Investment[b]	Rate earned	Net income[a]	Investment[b]	Rate earned
Crop-share lease							
Grain	(86-100)	$ 64	$ 1,824	3.21%	$ 61	$ 1,901	3.08%
Grain	(56-85)	52	1,490	3.20	45	1,512	2.72
Hog	(56-100)	52	1,643	2.89	64	1,699	3.41
Dairy	(56-100)	49	1,433	3.17	--[c]	--	--
Beef	(56-100)	--	--	--	--	--	--
Livestock-share lease							
Hog	(56-100)	--	--	--	$ 164	$ 1,833	4.36%
Dairy	(56-100)	--	--	--	160	1,734	6.65
Beef	(56-100)	--	--	--	120	1,734	3.82
Cash lease							
Grain	(86-100)	$ 76	$ 1,762	4.11%	$ 72	$ 1,799	3.90%
Grain	(56-85)	70	1,445	4.53	65	1,497	4.16
Hog	(56-100)	73	1,501	4.47	73	1,517	4.37
Dairy	(56-100)	59	1,399	3.71	39	1,313	2.49
Beef	(56-100)	68	1,468	4.22	93	1,627	5.37

[a]Net income is return to all capital, unpaid labor, and management, per tillable acre. No interest has been deducted.
[b]Investment is per acre and is calculated on the total acres in the farm.
[c]Empty cells indicate insufficient data.

Table 2b. Net Incomes per Tillable Acre for Southern Illinois Landowners, with Investment and Rate Earned by Type of Farm and Lease—Soil Productivity Rating 36 to 85

	Part-owner			Full tenant		
	Net income[a]	Investment[b]	Rate earned	Net income[a]	Investment[b]	Rate earned
Crop-share lease						
Grain	$ 66	$ 952	6.22%	$ 62	$ 1,223	4.72%
Hog	79	977	7.21	--[c]	--	--
Dairy	66	808	7.58	--	--	--
Beef	84	1,022	7.18	42	1,052	3.63
Cash lease						
Grain	$ 43	$ 991	3.95%	$ 51	$ 1,171	3.84%
Hog	92	1,076	7.44	--	--	--
Dairy	63	931	6.22	53	1,042	4.77
Beef	54	855	5.26	51	1,099	4.24

[a]Net income is return to all capital, unpaid labor, and management, per tillable acre. No interest has been deducted.
[b]Investment is per acre and is calculated on the total acres in the farm.
[c]Empty cells indicate insufficient data.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-15 *November 1989*

The Current Trends in Commercial Bank Financing of Farm Real Estate

Notable developments in farm real estate lending during the 1980s have been increases in the level and market share of farm real estate debt held by commercial banks. Banks traditionally have supplied short- and intermediate-term loans to farmers, but fewer long-term loans because long-term loans can put banks in situations involving adverse liquidity and interest rate exposure. But farm real estate loans by U.S. banks increased from $8.4 billion in 1982 to $15.8 billion in 1989, and the market share of all farm real estate loans increased from 7.6 percent in 1982 to 18.6 percent in 1989. The change in market share in Illinois was even greater, increasing from 8.4 percent in 1982 to 26.9 percent in 1989.

In contrast, the level and market shares of farm real estate debt held by farm credit banks and individuals declined considerably; the debt outstanding from life insurance companies declined although their shares remained relatively constant; and the debt levels and market shares of the Farmers Home Administration increased slightly.

These changes in farm real estate lending reflect several developments in agriculture and in the financial markets: severe financial stresses in the 1980s that have affected both farmers and agricultural lenders; the generally short-term nature of bank lending, which has allowed for more rapid portfolio adjustments than for long-term lending; the relatively high liquidity of agricultural banks during the 1980s; the greater competitiveness among lenders brought about by financial deregulation; and the interest among agricultural banks to offer a full range of short-, intermediate-, and long-term credit services to farm borrowers. Indeed, the banking industry was instrumental in developing and promoting the concept of a secondary market for farm real estate loans, reflected by the creation of Farmer Mac in the Agricultural Credit Act of 1987. Farmer Mac was designed to bring to agriculture a secondary mortgage loan market similar to housing's Ginnie and Fannie Mae. Farmer Mac is expected to become operational in early 1990.

These changes in farm real estate lending can have important implications for the cost and availability of credit for farmers, but little is known about the credit terms, pricing arrangements, purposes, and other characteristics of long-term lending by commercial banks. This report summarizes the results of a mail survey of agricultural banks in the five-state region of Illinois, Iowa, Missouri, Indiana, and Arkansas. The specific goals of the survey were to explain the growth in banks' loans secured by farm real estate; to determine loan purposes; to identify procedures for pricing, maturity, and credit evaluation; and to assess the future goals of agricultural banks in farm real estate lending, including the anticipated use of the new secondary market. The 1,625 banks receiving the survey had at least $2.5 million of agricultural loans or a ratio of farm loans to total loans that exceeded 25 percent. About 700 banks supplied information in the survey, yielding a response rate of 43 percent.

Loan Purposes, Pricing, and Credit Evaluations

Loan Purposes. As shown in Table 1, the banks responding to the survey indicated that loans secured by farm real estate are used for a variety of purposes: 61 percent, for the purchase and improvement of land and buildings; 25 percent, for refinancing other long-term loans; 9 percent, for refinancing agricultural production loans; and 5 percent, for other purposes. The relatively high incidence of refinancing likely reflects the financial stresses of the early 1980s.

Fixed- and Variable-Rate Loan Pricing. Fixed-rate loans are offered by 61 percent of the banks with an average maximum maturity of seven years. Variable-rate loans are offered by 67 percent of the banks, but only 31 percent of the banks offer both fixed- and variable-rate loans. Because banks can pass the risk of changes in market interest rates during the loan contract on to the borrower through variable-rate loans, it is logical to expect a lower interest rate on variable-rate loans than on fixed-rate loans. Consistent with this expectation, the survey results indicate that the average minimum interest rate for fixed-rate loans exceeded that for variable-rate loans by 0.29 percentage points, and the average maximum interest rate for fixed-rate loans exceeded that for variable-rate loans by 0.07 percentage points.

These pricing arrangements differ by the size of bank. The incidence of offering variable-rate loans is considerably higher at larger banks; fixed-rate loans are more prevalent at smaller banks; and when offered, the combination of fixed- and variable-rate loans is also higher at larger banks.

Loan Maturity. On average, over 60 percent of each bank's farm real estate loan volume has a maturity of five years or less, with a balloon payment due at the end of the loan contract. Only 10 percent of farm real estate loan volume has a six- to ten-year maturity, and 26 percent has a maturity greater than ten years. Larger banks indicate a slightly higher concentration of loan volume with longer maturities. Thus, in combination with the higher incidence of fixed-rate loans at smaller banks, it appears that banks are building repricing opportunities into fixed-rate lending by using relatively short maturities of five years or less with loan renewals at the end of the loan contract. Variable-rate loans tend to have longer maturities.

Down Payments. Virtually all of the banks require a minimum down payment or equity position to finance the purchase of farm real estate. The average minimum ratio of equity to appraised land value was 28 percent. The distribution of down payment over the past three years ranged from 11 to 25 percent of appraised value for 44 percent of the banks and from 26 to 50 percent of appraised value for 50 percent of the banks.

Risk-Adjusted Interest Rates. The survey responses indicate the extensive use of risk-adjusted interest rates by banks in which interest rates differ among farm borrowers according to differences in their credit risk. Table 2 reports results on banks' credit evaluation and risk pricing procedures. Eighty percent of large banks and 62 percent of smaller banks indicate that the interest rate charged to a borrower depends upon his or her credit risk. According to the survey, the most important credit factors for farm real estate are the borrower's collateral position and debt-servicing capacity, followed by profitability, repayment history, solvency, and liquidity.

Evaluating Credit Worthiness. The credit worthiness of borrowers can be evaluated in various ways, ranging from highly subjective, informal methods to numerical scoring techniques based on the borrower's financial data. Twenty-seven percent of the responding banks employ a credit-scoring or formal approach to evaluating the credit risk with farm real estate borrowers, and 37 percent utilize such an approach with other types of farm loans. Because 64 percent of the responding banks employ risk-adjusted interest rates, these lower incidences of credit scoring indicate that informal, credit-evaluation methods are employed by many of the banks.

Future Prospects of Banks' Farm Real Estate Lending

Considerable uncertainty exists about the future levels of farm real estate lending and the relative position of various financial institutions in this market. Farm profitability, investment opportunities for both banks and farmers, and future changes in land values are important. Also important are the competitive efforts of the banks and associations of the Farm Credit System, commercial banks, and life insurance companies. The presence of Farmer Mac introduces additional uncertainties about how much the new secondary market will be used and its financing implications for all types of lenders. Responses regarding the future goals of farm real estate lending along with anticipated secondary market activity are reported in Table 3.

The bankers responding to the survey indicate a conservative, but optimistic set of goals for farm real estate lending over the next three years. Forty-one percent of the banks anticipate that the volume of their farm real estate loans will remain about the same over the period, and 51 percent aim to increase farm real estate lending by 10 to 30 percent. Only 1 percent of the banks plan to decrease farm real estate lending by more than 10 percent.

When asked about the effects of the new secondary market for farm real estate loans, 8 percent of the banks indicate a substantial increase in farm real estate lending, 30 percent indicate a slight increase, 53 percent indicate no change, and 9 percent were undecided. Large banks clearly anticipated greater use of the secondary market, with 42 percent of the banks responding to the survey taking the necessary actions to qualify as a formal originator of farm real estate loans qualified for sale in the market.

Implications

In general, the results of the survey indicate that the growth of farm real estate loans by commercial banks will likely continue, although at a more modest pace. This growth will reflect a variety of loan purposes, mostly involving financing the purchases of farmland and buildings. However, it remains unclear whether the credit terms employed by banks in the past are well suited to the financing needs of farm borrowers. The heavy reliance by virtually all the responding banks, but especially the smaller ones, on fixed-rate loans with relatively short maturities (five years or less), balloon payments, and intended rollovers or renewals create uncertainties for borrowers about credit availability and interest rates at loan maturity and about meeting potentially higher repayment obligations. But variable-rate loans also transfer interest rate risks from the lender to the borrower. Thus, opportunities remain for agricultural banks to further develop farm real estate lending programs in order to stabilize the credit position of farm borrowers.

The new secondary market for farm real estate loans could have a significant effect on farm lending by commercial banks. Longer maturities on fixed-rate loans should be possible, and greater uniformity should occur in credit evaluations, loan documentation, and pricing for banks directly involved in secondary market transactions as well as for competing banks. These developments will be based on how much agricultural banks use the secondary market, a fact that will only become known as Farmer Mac becomes operational in the 1990s. For a more complete description of the survey and results, see *Farm Real Estate Lending by Commercial Banks* by Paul N. Ellinger and Peter J. Barry, Department of Agricultural Economics, 305 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801.

Prepared by :

Peter J. Barry
Professor, Agricultural Finance

Paul N. Ellinger
Research Economist, Finance

Issued by:

R.P. Kesler

R.P. Kesler

Table 1. Purposes, Pricing, and Maturities of Loans Secured by Farm Real Estate

	Bank size		
	Assets less than $100 million	Assets equal to or greater than $100 million	All banks
	-------------*percent of loan volume*-------------		
Purposes of farm real estate loans			
Purchase and improvements of land	52	49	52
Purchase and improvements of buildings	8	10	9
Purchase of machinery, equipment, and other farm and nonfarm items	6	5	6
Refinancing of long-term loans	23	26	24
Refinancing of other loans	10	10	10
	100	100	100
	----------*percent of banks offering*-----------		
Types of loans			
Fixed-rate loans	64	46	61
Variable-rate loans	64	74	67
Fixed-rate and variable-rate loans	31	34	31
	----*percent of farm real estate loan volume*---		
Maturity distribution			
0 to 5 years (with balloon)	61	53	61
0 to 5 years (without balloon)	4	2	3
6 to 10 years (with balloon)	6	5	6
6 to 10 years (without balloon)	4	5	4
11 to 20 years	23	32	24
Greater than 20 years	2	1	2

Table 2. Credit Evaluation and Risk Pricing of Loans Secured by Farm Real Estate

	Bank size		
	Assets less than $100 million	Assets equal to or greater than $100 million	All banks
	----------------------*percent of banks*-----------------------		
Use of risk-adjusted interest rates	62	80	64
Weights on credit factors of a borrower			
Solvency	11	11	11
Profitability	17	19	17
Debt-servicing capacity	23	26	23
Liquidity	9	9	9
Repayment history	12	12	12
Collateral	27	22	26
Other	1	1	1
	100	100	100
Use of a credit-scoring worksheet or formal credit risk evaluation			
Farm real estate loans	25	33	27
Other farm loans	37	37	37

Table 3. Future Goals for Farm Real Estate Lending and Secondary Market Activity

	Bank size		
	Assets less than $100 million	Assets equal to or greater than $100 million	All banks
	percent of banks		
Goals for real estate loans in the next three years			
Increase more than 30 percent	5	4	4
Increase 10 to 30 percent	51	53	51
Remain about the same	42	37	41
Decrease 10 to 30 percent	1	1	1
Decrease more than 30 percent	1	1	0
	100	100	100
Anticipated expansion of geographic lending market	24	32	25
Effects of Farmer Mac on banks' involvement in farm real-estate lending in the next three years			
Increase substantially	7	17	8
Increase slightly	29	32	30
No change	55	40	53
Decrease	0	2	0
Undecided	9	10	9
Banks purchasing Farmer Mac stock to qualify as loan originator	42	43	42

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

ces
Cooperative
Extension
Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-16 *November 1989*

Income-Tax Planning: An Important Business Management Procedure for Farmers

Income-tax planning is usually considered a task that a farmer performs late in the tax year to assess carefully the likely impact of paying taxes on his or her business. But more than two or three weeks in December may be required to make the necessary adjustments for a good tax plan. Because so many transactions can have substantial tax consequences, good tax management should be a year-round process.

Reasons for Tax Planning

Good tax planning through the remainder of 1989 will help minimize income-tax liability over the next few years. For many farm operators–especially those in areas where the 1988 drought reduced yields substantially, taxable incomes this year may be considerably lower than they were in previous years because of decreased inventories of grain carried into and sold in 1989 and increased operating expenses in 1989 from fewer set-aside acres and more acres planted to corn and soybeans. Offsetting some of this increase in operating expenses is the relatively low amount of depreciation on farm equipment due to the limited amount of machinery replacement the past few years. Prior to determining what adjustments to taxable income should be made before the end of the year, an estimate should be made of next year's gross income based on this year's yields and prices. Improved yields in 1989 in many areas of the state should result in higher gross income next year for many producers. Producers that redeemed or forfeited government crop loans in the three-year reserve program will also need to consider the ramification of these transactions on income tax.

Steps in Tax Planning

The basis for tax planning is an accurate and comprehensive set of farm business records. For most sole proprietors, these records should include business transactions as well as personal expenditures that might qualify for itemized deductions. More farmers are moving toward reconciling all funds flowing through the account in order to verify mathematically that no items have been omitted or duplicated.

In addition to summarizing year-to-date data for 1989, farmers should also be aware how disaster payments, the proceeds of multiperil crop insurance, and forced sales of livestock due to drought conditions are taxed in 1988 and 1989. Our focus is primarily on the cash-basis farmer, but most of alternatives that we consider here will apply to the accrual-basis person as well.

The goal of tax planning is to minimize the amount of income tax that must be paid over time. This goal is usually accomplished by leveling taxable income to avoid the wide fluctuations that might push the planner into a higher tax bracket. Because of the magnitude of self-employment tax rates, planning may occasionally take another route. The Tax Reform Act of 1986 has widened the interval from one rate to the next so that plans for avoiding higher tax rates may not have to be as precise.

The first step, as suggested above, is to post all transactions in your farm record book or input into your microcomputer. Then run totals on all of the accounts. Record these totals on a tax worksheet or on a blank copy of last year's schedule F and/or form 4797. Many tax worksheets are designed with three columns: one for year-to-date, a second for projections and adjustments, and the third for the total.

An example income–tax projection worksheet from North Central Regional Publication No. 2, *Income Tax Management for Farmers*, appears at the end of this article.

Next, list all income that you will be receiving before the end of the year and all expenses that must be paid by the end of the year. Then list income that may be received this year or carried over into next year and the expenses that can be paid by the end of the year but are not due until the following year. This method will give you an idea of what your projected income will be for the year and to what extent you can make adjustments to that projection.

Last year's depreciation may serve as a guide for making an estimate for this year. With so many items having reached the end of their depreciable life under the Accelerated Cost Recovery System (ACRS), it would be best to review last year's schedule rather thoroughly. The depreciation on purchases in the current year should be included in an estimate. Some computer programs have the capability of calculating next year's depreciation for items currently on the schedule.

A review of the previous year's tax return is normally the starting point for an evaluation and relative comparison of the current year's income level. It is only a guide, however, because the current year and the forthcoming year can still be changed.

Several figures might help determine both the gross income and the net income levels you want to attain. Many grain farmers follow a procedure of carrying over a substantial portion of the crop into the next calendar year. Once this year's gross income to-date has been calculated, compare it with a projection of what next year's sales may be, based on the current inventory. If there is price uncertainty associated with next year's sales, plan on letting next year's gross run at least 5 percent higher than this year's.

If parts of two crops are sold in one year, it is a little more difficult to identify what gross income you want to report. It probably should approximate an annual projected gross income for the farm.

For those individuals who have an accrual-basis income statement, the previous years' accrual net income may serve as a guideline for the current year's cash-basis income. Projecting from such a figure should help to bring one close to the net income that good tax planning would suggest you might want to achieve. In gathering data for a comparison with last year, make sure that any significant nonfarm data is also included in your analysis.

Treatment of Crop Insurance and Disaster Payments

Crop insurance payments and disaster payments normally are included as income in the year payment is received. However, if you are using the cash method of accounting, you may elect to postpone reporting these payments until the following year. Many producers who received crop insurance and disaster payments in 1988 elected to report this income in 1989. Do not forget to include these payments when totaling your 1989 income. Certain areas of the state received severe hail damage early this summer. Producers that received proceeds from crop insurance will need to determine if they qualify to elect to postpone reporting these payments, and depending on their individual situation, whether it would be advantageous or not to postpone reporting this income.

To make the election to postpone reporting the proceeds from crop insurance, you must be able to show that the income from the damaged crops would have been reported in any tax year following the year the damage occurred.

To make this election, attach a statement to your return for the year the damage took place. The statement must include your name, address, and the following:

- a statement that you are making the election under section 451(d) of the Internal Revenue Code and sections 1.451-6 of the regulations,
- what crop or crops were destroyed,
- a statement under your normal business practice that you would have included the income derived from the damaged or destroyed crops for a tax year following the tax year of destruction,
- the cause and date of damage,
- an itemized account of the insurance payment received, along with the date received, and
- the name of the insurance carrier from whom you received the payments.

Methods of Adjusting Income

During the past two years, most producers were concerned about ways to lower their income before the end of the year. However, with the lower inventories of grain carried into this year as a result of the 1988 drought, many producers may need to increase their income before the end of the year. In addition to low crop yields the previous year, a change in the farm lease from a crop share to cash rent and farming increased acreage are other reasons farm income may be low for a given year. At the minimum, net farm and nonfarm income should be high enough to cover the taxpayer's standard deductions and personal exemptions. For 1989, this amount would be $13,200 for a taxpayer who has a family of four and who is married and filing a joint return.

Two ways to increase income are selling some new-crop grain and collecting before the end of the year, and delaying payment of those expenses that are not required to be paid until after the first of the year. Some additional advantages that may occur by selling new-crop grain include reducing expenses by eliminating or reducing storage, shrink, and interest charges. Fall grain sales also improve a farmer's cash flow.

Farmers looking for ways to lower their income before the end of the year may defer reporting income from fall grain sales by signing a delayed payment contract with their elevator when the grain is sold. These contracts state that proceeds from the grain sale cannot be collected until after the first of the year.

Another way to lower income for the current year is to prepay next year's farm-operating expenses. When prepaying, be sure your purchase invoice states the quantity and price of the supplies. Just a down payment toward next year's bills is not acceptable. There also should be an economic reason for prepaying expenses, such as receiving a cash discount for paying ahead. Some of the more common expenses that are prepaid include fertilizer, seed, feed, and chemicals. Also you may want to pay up any accrued interest or drying and storing charges. Prepayments of interest, cash rent, or insurance are not deductible. When prepaying expenses, be sure to pay those that yield the largest economic return first, that is, those that have the largest cash discount and those that will need to be paid soon after the first of the year.

Producers who have purchased machinery or equipment during the year may elect to expense those purchases in the current year instead of setting them up on depreciation. Producers can expense up to $10,000 of eligible capital purchases. If few capital purchases have been made this year and no more are planned, the prepayment of cash-operating expenses usually should carry a higher priority for added deductions than for machinery and equipment purchases.

Another method used to lower income is contributing to an IRA, Keogh plan, or both. Contributions to these plans generally reduce gross income. The Tax Reform Act of 1986, however, has placed some limitations on the deductibility of IRA contributions. It should be noted that although contributions can be made to Keogh plans up to the due date of the tax return, the plan must be established by the end of the tax year to allow a deduction for those contributions.

Tax Law Changes

Producers need to keep informed of new changes in tax laws that may affect their business. Tax law changes that affect farm operators in 1989 include the following:

- All farm business property placed in service after 1988 must use a 150 percent declining balance instead of a 200 percent declining balance.

- Single-purpose agricultural structures are assigned a ten-year life recovery period instead of a seven-year life recovery period.

- The deduction of any costs of the first telephone line to a personal residence has been eliminated.

- Social security taxes apply to the cash wages of all farm workers regardless of the amount paid if the total cash wages paid to all farm workers is $2,500 or more. If this $2,500-or-more test is not met, then only those farm workers paid $150 or more are subject to a social security tax.

- The uniform capitalization rules, often called the "heifer tax," was repealed for certain producers of animals who had been required to capitalize preproduction expenses. These rules take effect for expenses incurred after December 31, 1988.

Congress is currently working on additional tax law changes in the Revenue Reconciliation Bill of 1989. Items in this legislation, if passed, that could affect certain producers include changes in the capital gains tax and new income–tax withholding requirements for agricultural workers subject to FICA withholding.

Changes in tax laws and the wide fluctuations of incomes have increased the importance of tax planning for farm operators. The key to tax planning is to start now in order to allow time for adjustments before the end of the year.

Prepared by:

Charles Cagley
Agricultural Economist and

Dale H. Lattz
Extension Specialist,
Farm Management

Issued by:

Dale H. Lattz

The Federal Income Tax Projection Worksheet

Use this worksheet throughout the year in planning farm business and tax management strategies. If you do not use it throughout the year, use it in November to plan tax savings in December.

	Amount to Date	Estimated Rest of Year	Estimated Year's Total
FARM RECEIPTS:			
Sales of product raised[a] and miscellaneous receipts:			
Cattle, hogs, sheep and wool, etc.	$______	______	______
Poultry, eggs and dairy products	$______	______	______
All crop sales	$______	______	______
Custom work, prorations and refunds agriculture program payments	$______	______	______
Total sales and other farm income (1)	$______	______	______
Sales of purchased market livestock[b]	$______	______	______
Purchase cost (subtract)[c]	$______	______	______
Gross profits on sale of purchased livestock (2)	$______	______	______
Gross farm profits (Item 1 + 2) (3)	$______	______	______

FARM EXPENSES:

Breeding fees	$______	Pension, profit sharing	$______
Chemicals	$______	Rent of farm, pasture	$______
Conservation expenses	$______	Repairs, maintenance	$______
Custom hire (machine work)	$______	Seeds, plants pruchased	$______
Employee benefit programs	$______	Storage, warehousing	$______
Feed Purchased	$______	Supplies purchased	$______
Fertilizers and lime	$______	Taxes	$______
Freight, trucking	$______	Utilities	$______
Gasoline, fuel oil	$______	Veterinary Feeds	$______
Insurance	$______	Other	$______
Labor hired	$______	Other	$______

	Amount to Date	Estimated Rest of Year	Estimated Year's Total
Total cash farm expenses (4)	$______	______	______
Depreciation on machinery improvements, dairy and breeding stock (5)	$______	______	______
Total deductions (Item 4 + 5) (6)	$______	______	______
Self employment farm income (Item 3 less item 6) (7)	$______	______	______
OTHER INCOME:			
Net taxable gain from Schedule D (Sales of dairy and breeding stock, machinery and other capital exchanges (8)	$______	______	______
Taxable non-farm income (9)	$______	______	______
Adjusted gross income (Item 7 + 8 + 9) (10)	$______	______	______
Less: standard deduction or itemized deductions[d]	$______	______	______
$2,000 × ______ personal exemptions[e]	$______	______	______
Total non-business deductions and exemptions (11)	$______	______	______
Taxable income (Item 10 less item 11) (12)	$______	______	______
Estimated income tax (calculated from applicable tax computation table or rates) (13)	$______	______	______
Estimated self-employment tax (Item 7 × .1302)[f] (14)	$______	______	______
TOTAL TAX (Item 13 + 14) (15)	$______	______	______
Less Credits: allowable investment credit and carryover, gas tax, income tax withheld and estimated tax paid (16)	$______	______	______
Estimated tax due (Item 15 less item 16) (17)	$______	______	______

Last year's marginal tax bracket ______ %

This year's estimated marginal tax bracket ______ %

Next year's expected marginal tax bracket ______ %

[a] For accural method include sales of all livestock.

[b] Omit for accural method.

[c] For accural method adjust for change in inventory and new purchases.

[d] Use itemized deductions if larger.

[e] Exemption for 1989 see current tax regulation for subsequent years.

[f] Rate for 1989 see current tax regulation for subsequent years.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-17 *December 1989*

The Projected Financial Condition of Illinois Cash-Grain Farms 1990-1993

The outlook for commodity prices and the government farm programs remains uncertain as we enter the 1990s. The 1990 Farm Bill, which is under much debate, will have considerable influence on farm policy and commodity prices well into the future. The General Agreement on Tariffs and Trade (GATT) negotiations and new agricultural trade agreements with foreign nations may provide an unexpected boost for U.S. farm exports. However, many foreign nations will continue to expand their planted acreage, directly competing with U.S. farmers for farm export sales.

Many farmers today are still experiencing financial problems from the farm crisis of the 1980s and the drought of 1988. This report projects the financial performance of Illinois cash-grain farms under a given set of commodity prices and production costs. Projections are made for farms under different tenure patterns and initial debt level assumptions. Farmers and their advisers can utilize this information in evaluating the future financial performance of their farm businesses.

Projected Economic Situations of Northern and Central Illinois Cash-Grain Farms

Net farm income is projected four years into the future under three farm tenure patterns (full owner, part owner, and full tenant) at three initial debt-to-asset (D/A) ratios (20 percent, 40 percent, and 70 percent). The prices used to project net farm income, summarized in Table 1, are based upon price

Table 1. Commodity Prices Used to Project the Financial Condition of Illinois Cash-Grain Farms

		1990	1991	1992	1993
		dollars per bushel			
Corn					
	Target	$2.75	$2.75	$2.75	$2.75
	Cash	2.09	2.09	2.12	2.31
	Loan	1.57	1.55	1.58	1.60
	Deficiency	0.66	0.66	0.63	0.44
Soybeans					
	Cash	5.32	6.14	6.01	6.10
Wheat					
	Target	4.00	4.00	4.00	4.00
	Cash	3.52	3.16	3.01	3.26
	Loan	2.06	2.29	2.31	2.42
	Deficiency	0.48	0.84	0.99	0.74

Estimates based upon Food and Agricultural Policy Research Institute (FAPRI) data.

projections made by the Food and Agricultural Policy Research Institute (FAPRI). Assumptions about farm size, production costs, and capital asset values are based upon 340- to 799-acre grain farms in northern and central Illinois whose operators participate in the Farm Business Farm Management (FBFM) record-keeping service.

The farm scenario in these simulations consists of 530 tillable acres. The cropping pattern is 54-percent corn and set-aside (286 acres) and 46-percent soybeans (244 acres). The farm participates in the Feed Grains Program over the next four years with 10 percent of its corn base idle each year. This results in 257.4 acres of corn and 28.6 acres of set-aside each year. Assumed yields are 144 bushels per acre for corn and 45 bushels per acre for soybeans. The average yields for corn and soybeans increase by 2 percent each year. The ASCS corn program yield is 144 bushels per acre in each of the four years. The corn target price remains at $2.75 per bushel over the four-year period.

Production costs are assumed to increase 2 percent each year. Interest rates are assumed to remain constant at 10.75 percent for long-term loans and at 11.5 percent for operating loans. Real estate values are also assumed to remain constant over the next four years. The full owner owns all 530 tillable acres. The part owner owns 265 tillable acres and share-rents 265 tillable acres on a 50-50 basis. The full tenant share-rents 530 acres on a 50-50 basis.

In these simulations, net farm income is projected for each year of the four-year period. It is assumed that off-farm income equals $8,500 and that family living expenses equal $26,500 each year. These amounts reflect FBFM averages for 1988 and these figures are assumed to increase 2 percent each year. Capital purchases of $30,584 and $31,820 are made by each farm in 1990 and 1992, respectively. Each farm starts with a $10,000 cash balance and an initial operating loan balance reflecting their D/A ratio. Initial and end-of-year operating loan balances, net worth, and D/A ratios are reported for each farm scenario. Also, net farm income and return on equity (ROE) are reported each year. The ROE is calculated by taking net farm income minus an unpaid operator labor expense of $14,810 per year divided by the average of the beginning and ending net worth for the year.

Northern and Central Illinois Cash-Grain Farms with an Initial D/A Ratio of 20 Percent

Results of the four-year financial projection for northern and central Illinois cash-grain farms with an initial D/A of 20 percent are summarized in Table 2. Net farm income generally exceeds family living expenses for the full and part owners; however, the full tenant's net farm income is below family living expenses in each of the four years. Low soybean prices in 1990 result in relatively low net farm income figures for the first year.

The ROE is just over 3 percent for the full and part owners. On the other hand, the ROE for the full tenant averages less than 2 percent for the four years. These rates of return on equity are well below current off-farm investment opportunities.

The initial operating loan is eliminated in the second year for the full and part owners. The full tenant's operating loan is reduced but continues throughout the four years. An operating loan balance of zero indicates that net farm income, nonfarm income, and initial cash on hand are sufficient during the year to meet assumed family living and tax expenses, principal payments, and down payments on capital purchases.

Net worth increases for the full and part owners, but declines for the full tenant over the four years. The full tenant's net income is not sufficient to meet assumed family living expenses, principal payments, and the down payment on capital purchases.

The D/A ratio declines from 20 percent for the full and part owners. The full tenant's ending D/A ratio is higher than the initial level. This increase is due to the low profitability of the farm firm and the large capital purchases made with borrowed capital. Overall, the full and part owners are projected to make modest financial progress while the full tenant would experience some deterioration in his or her financial position.

Table 2. Projected Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 20 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	D/A ratio, percent
Full Owner					
Initial			20,893	1,018,730	.20
1990	37,221	2.2	73	1,030,951	.19
1991	48,540	3.2	0	1,049,947	.18
1992	49,881	3.3	0	1,065,557	.19
1993	51,913	3.4	0	1,082,473	.17
Part Owner					
Initial			16,170	602,258	.20
1990	25,955	1.8	3,669	603,213	.20
1991	33,243	3.0	0	610,737	.19
1992	34,509	3.1	0	616,906	.20
1993	35,139	3.1	0	622,835	.18
Full Tenant					
Initial			11,477	185,786	.20
1990	14,800	0.0	5,219	179,586	.24
1991	18,532	1.9	0	175,804	.21
1992	19,249	2.2	2,154	171,203	.28
1993	18,233	1.4	3,711	164,962	.25

Northern and Central Illinois Cash-Grain Farms with an Initial D/A Ratio of 40 Percent

Results of the four-year financial projection for northern and central Illinois cash-grain farms with an initial D/A ratio of 40 percent are summarized in Table 3. Net farm income is in the $9,000 range for each of the three tenancy positions in 1990. During the following three years, net farm income remains below family living expenses for each of the three tenancy positions reflecting the large interest expense each farm has incurred.

The ROE is negative the first year for the full and part owners and remains less than 1 percent in the last three years. The ROE is negative for the full tenant in all four years reflecting an income shortage in this farming operation. The operating loan balance increases for all three tenancy positions as net farm income is not sufficient to meet all income demands.

As one would expect, net worth steadily declines for each of the three farms while the D/A ratio rises from its initial position of 40 percent. The D/A ratio rises 1 percent for the full owner, 3 percent for the part owner, and 14 percent for the full tenant by the end of 1993.

Changes need to be considered for these farming operations. Operators should carefully analyze their farming operations for cost-cutting or profit-enhancing measures. Grain inventories could be reduced in order to decrease the debt load and interest expense. The possibility of increasing off-farm income or reducing family living expenses should be examined. Another alternative may be to postpone the capital purchases schedule for 1990 and 1992 until a later date; however, machinery repair expenses may increase with the delay of machinery replacement. If the operator is able to reduce living expenses and postpone capital purchases without incurring major increases in machinery repair expense, the operating loan balance will remain near

Table 3. Projected Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 40 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	D/A ratio, percent
Full Owner					
Initial			41,786	764,048	.40
1990	9,686	-0.7	53,102	754,734	.41
1991	18,449	0.4	65,336	752,429	.40
1992	19,637	0.6	88,733	748,241	.41
1993	20,376	0.6	110,674	744,024	.41
Part Owner					
Initial			32,240	451,794	.40
1990	9,960	-1.2	37,188	403,954	.42
1991	15,764	0.1	45,571	410,972	.41
1992	16,555	0.2	64,000	416,522	.43
1993	16,075	0.1	81,295	422,945	.43
Full Tenant					
Initial			22,894	139,399	.40
1990	9,721	-3.9	24,347	128,060	.46
1991	12,834	-1.9	29,150	120,130	.46
1992	13,198	-2.0	42,814	111,217	.53
1993	11,479	-4.1	55,673	100,068	.54

its initial level while the D/A ratio declines. These measures will ensure that the operator will continue farming with a financially stressed but viable farming operation.

Northern and Central Illinois Cash-Grain Farms with an Initial D/A Ratio of 70 Percent

Results of the four-year financial projection for northern and central Illinois cash-grain farms with an initial D/A ratio of 70 percent are summarized in Table 4. Net farm income is negative in each of the four years for the full and part owners. Net farm income is positive for the full tenant, but the level is far below family living expenses.

The ROE is negative for all four years of this projection model reflecting the low incomes due to the heavy debt loads of these farming operations. The operating loan increases dramatically for each farming operation under these conditions. Net worth substantially declines for each farming operation while the D/A ratio continues to increase toward a level of insolvency. The financial viability of these farming operations is threatened. Significant changes must occur before the end of this four-year period in order for these farms to remain in business.

Southern Illinois Cash-Grain Farms with an Initial D/A Ratio of 20, 40, and 70 Percent

Net farm income for a southern Illinois cash-grain farm under initial D/A ratios of 20, 40, and 70 percent is projected four years into the future. The farm used in this model utilizes cost and yield data from southern Illinois grain farming operations participating in the FBFM record-keeping service. The farm has 530 tillable acres of which 265 tillable acres are owned and 265 tillable acres are rented on a one-third–two-thirds basis. The landlord pays one-third of the fertilizer and chemical expenses while collecting one-third of the crop and the farm program payments. The tenant pays for the balance of the expenses and collects two-thirds of the crop and the farm program payments.

Table 4. Projected Financial Condition of Northern and Central Illinois Cash-Grain Farms with Initial Debt-to-Asset Ratio of 70 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	D/A ratio, percent
Full Owner					
Initial			73,127	382,023	.70
1990	-31,617	-13.0	140,649	332,406	.74
1991	-27,608	-13.8	214,157	286,438	.77
1992	-31,573	-18.0	303,170	236,138	.82
1993	-36,283	-25.0	397,880	180,753	.86
Part Owner					
Initial			56,595	225,847	.70
1990	-14,812	-14.2	99,997	193,035	.75
1991	-11,551	-15.0	143,024	163,124	.78
1992	-13,722	-19.9	201,534	130,675	.83
1993	-17,297	-29.4	263,246	94,276	.87
Full Tenant					
Initial			69,477	69,670	.70
1990	2,103	-20.7	53,235	53,773	.77
1991	4,632	-22.6	72,094	39,606	.82
1992	4,220	-35.3	100,891	24,218	.90
1993	1,691	-93.3	130,388	6,022	.97

The cropping pattern is 40-percent corn and corn set-aside (212 acres), 40-percent soybeans (212 acres), and 20-percent wheat and wheat set-aside (106 acres). Average yields for this farm are 105 bushels per acre for corn, 34 bushels per acre for soybeans, and 55 bushels per acre for wheat. All wheat expenses will be realized during the year of harvest and not in the year of planting.

This farm participates in the Feed Grains and Wheat programs in each of the four years. During the 1990 crop year, each farm participates in the 1990 Modified Wheat Program and plants 100 percent of their 106-acre wheat base. Otherwise, the set-aside requirements are 10 percent of the base acres for corn and 5 percent of the base acres for wheat. The ASCS program yield for corn is equal to the present yield of 105 bushels per acre while the program yield for wheat is less than the present yield at 45 bushels per acre.

Results of the four-year financial projection for southern Illinois cash-grain farms with an initial D/A ratio of 20, 40, and 70 percent are summarized in Table 5. Net farm income is below family living expenses for the farm with an initial D/A ratio of 20 percent. The average ROE for this farm is just over 1 percent per year. The operating loan balance declines initially, but rises again by the end of the four-year period. Net worth falls as net farm income is not sufficient to meet all cash demands. The D/A ratio increases in 1990 and 1992 as a result of the major capital purchases in those years. In summary, the four-year projection of a southern Illinois grain farm with a D/A ratio of 20 percent indicates that the farm can continue; however, the farm will make little financial progress over the next four years.

Net farm income is positive for the southern Illinois grain farm with a D/A ratio of 40 percent, but the income figure is well below current cash demands. Thus, the operating loan balance continues to escalate throughout the four-year period. The ROE is negative in each year of the four-year period. Net worth declines while the D/A ratio rises from 40 to 49 percent. Changes must occur in order for this farming operation to make any financial progress.

Table 5. Projected Financial Condition of Southern Illinois Cash-Grain Farms

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	D/A ratio, percent
D/A 20%					
Initial			12,231	413,055	.20
1990	17,617	0.7	3,381	408,623	.22
1991	20,979	1.4	0	406,443	.20
1992	21,849	1.6	3,273	403,695	.22
1993	21,147	1.3	4,967	399,574	.21
D/A 40%					
Initial			24,462	309,791	.40
1990	6,376	-2.8	30,622	297,167	.43
1991	8,795	-2.2	42,123	286,219	.44
1992	8,658	-2.4	63,168	273,999	.47
1993	5,204	-4.0	85,430	257,961	.49
D/A 70%					
Initial			42,808	153,896	.70
1990	-10,521	-18.2	74,417	125,375	.76
1991	-10,001	-22.7	113,910	97,014	.81
1992	-12,220	-34.0	165,398	66,067	.87
1993	-16,367	-66.6	220,067	30,598	.94

The financial projections of a cash-grain farming operation in southern Illinois with a D/A ratio of 70 percent indicate that this farm is under extreme financial stress. Net farm income and the ROE are negative for the four-year period. The operating loan balance quickly escalates from the shortage of income in this farming operation. Net worth dwindles while the D/A ratio approaches a level of insolvency. Significant changes must occur in order for this farming operation to remain financially viable.

The results of these simulations of southern Illinois cash-grain farms illustrate low or negative net income returns. The farm with an initial D/A ratio of 20 percent will survive over this four-year period, but the farm will make little financial progress. The farms with a higher D/A ratio need to make significant changes in their farming operations to reverse the downward financial trends.

Buying, Leasing, or No Change

In this section, we evaluate a scenario in which a farmer has the opportunity to either (1) purchase additional land, (2) share-rent more land, or (3) make no changes at all. The farm used in this scenario is identical to the one in Table 3 (50-percent tenancy with a D/A ratio of 20 percent) with one noted exception—the operator has a cash balance of $40,000 instead of $10,000 at the start of 1990. The farm has the option of purchasing 80 tillable acres for $160,000, share-renting 80 tillable acres on a 50-50 basis, or making no changes at all. The 80 acres are assumed to be identical to existing land holdings in terms of yield, crop mix, and government farm program payments. The operator can begin farming these 80 acres at the start of 1990.

If the operator decides to purchase the parcel of land, the $40,000 cash balance will be utilized as the 20-percent down payment on the purchase of the land. The remaining balance will be amortized over a 25-year period at a 10.75-percent interest rate.

If the operator decides to farm the additional acreage either by purchasing or share-renting, the existing machinery line will be sufficient to meet the added demands. However, a small increase in hired labor and machinery repair expense will occur.

If the operator decides to share-rent or make no changes at all, the $40,000 cash balance will eliminate the operating loan balance and the need to borrow additional capital for the machinery purchases in 1990 and 1992.

Results of the purchase, share-rent, and no-change scenarios are presented in Table 6. Net farm income under all three scenarios is sufficient to meet family living expenses. Share-renting provides the highest net farm income with land-purchasing providing the lowest. The ROE is highest for the share-rent farm and lowest for the land-purchase farm.

The share-rent and no-change farms' cash balances are building toward their initial levels of $40,000 each. In addition, one must remember that the cash balance reflects the elimination of the operating loan balance of $26,000 and the payment of cash for two major capital purchases in 1990 and 1992. The cash balance for the land purchase scenario is positive; however, the cash balance reflects an additional $50,000 loan for the two capital purchases.

Net worth increases under all three scenarios. The highest net worth is for the share-rent farm followed by the no-change farm, while the land-purchase farm has the lowest. The D/A ratio for the land-purchase farm rises to 31 percent from the additional financing of the parcel of land and continues to remain near that level throughout the four-year period. The D/A ratio for the share-rent and no-change scenarios decreases from 20 to 13 percent during the four-year period reflecting the use of cash instead of borrowed capital for capital purchases.

Table 6. Northern and Central Illinois Part-Owner Cash-Grain Farms with Initial Debt-to-Asset Ratio of 20 Percent--Purchase, Share Rent versus No-Change Comparison

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	D/A ratio, percent
Purchase Land					
Initial			40,000	632,258	.31
1990	23,285	1.3	-9,501	630,542	.31
1991	32,781	2.8	2,165	638,420	.29
1992	34,880	3.0	4,830	645,101	.30
1993	33,271	2.7	7,832*	649,001	.29
Share-Rent					
Initial			40,000	632,258	.20
1990	33,204	2.9	10,580	641,462	.16
1991	42,403	4.2	32,600	655,934	.15
1992	42,961	4.2	18,767	666,954	.14
1993	43,954	4.2	36,035	677,935	.13
No Change					
Initial			40,000	632,258	.20
1990	27,926	2.0	6,642	637,524	.17
1991	36,359	3.3	24,228	647,562	.15
1992	36,939	3.3	6,727	654,914	.14
1993	37,729	3.3	20,467	662,376	.13

*Balance reflects an additional capital purchase loan of $50,000.

Land value inflation rate needed per year for ending net worth of land purchase scenario to equal ending net worth of:

Share-rent scenario 4.25%

No-change scenario 2.05%

In summary, the land-purchase farm would be able to purchase the 80 acres under the scenario described, but the increased financial risk associated with the purchase will place the farm near the threshold of questionable financial stability. The best option in terms of net worth and ROE would be to share-rent the land and utilize any cash surpluses for reductions in the debt load. The no-change scenario is the second best option as the farm applies the cash balance to reducing debt. At the end of the four-year period, the share-rent and no-change farms are in excellent financial condition. The share-rent and no-change farms have accumulated large cash balances that can be invested in off-farm ventures or utilized as a down payment on a land purchase. The land-purchase farm is in a risky situation and is not in a good position to incur any more debt for the purchase of land at the end of the four-year period.

In these scenarios, land values were assumed to remain constant. If land values were rising, the land value inflation rate would have to average 4.25 percent per year over the four-year period in order for the ending net worth of the land-purchase scenario to equal the share-rent scenario. Land values would have to increase 2.05 percent per year in order for the ending net worth of the land-purchase scenario to equal the no-change scenario. If land values continued to rise at a level greater than 4.25 percent, the best option would be to purchase the land. The land-purchase option may also be preferable if the farm operator were willing to accept a greater level of financial risk for the guarantee of continuing to farm additional acres. Land values have increased at higher levels over the last few years; however, the potential for future increases is uncertain.

In this case, the acreage in question was 80 acres and the assumption was that the farm had a line of machinery sufficient to meet the additional acreage requirements. If the additional acreage in question was significantly larger or if the operator had to make additional machinery purchases, the no-change scenario might be the best option. Again, the operator must consider all factors involved before a final decision is made.

Farming for a 6-Percent ROE

The ROE for the farms in our projection scenarios have fallen far short of the returns available from off-farm investments. In this section, the changes in yields, prices, and expenses are calculated to determine what percentage change must occur to reach a desired ROE level of 6 percent. For instance, holding all other factors constant, what percentage increase in yield would give a farming operation a 6-percent ROE? The four model farms in these examples each have a D/A ratio of 20 percent. These farms are identical to the ones in Table 2 for the full owner, the part owner, and the full tenant farming operations for northern and central Illinois. The financial model for the southern Illinois grain farm is taken from Table 5.

Full and Part Owners

Results for the full and part owners are indicated in Tables 7 and 8. Holding all other factors constant, an average increase in yield of 20 percent for corn and soybeans will generate enough farm income for the full and part owners to attain a 6-percent ROE.

An increase in prices received of 30 percent for the full owner and 27.5 percent for the part owner for corn and soybeans will also generate a 6-percent ROE. With the increase in prices received, neither farm participates in the government farm program planting their entire corn base in corn. In this scenario, the market price for corn is at or above the target price for corn.

Reducing costs is another way to increase net farm income. In this scenario, costs must be reduced by 25 percent for the full and part owners to attain a 6-percent ROE. In all cases, net farm income for the full owner must increase approximately 6 percent to achieve a 6-percent ROE while the part owner's net farm income must increase approximately 55 percent.

Full Tenant

In Table 9, the results of the full tenant grain farming operation with a D/A ratio of 20 percent are presented. In this scenario, the full tenant's yields must increase by only 10 percent while prices and costs remain constant. Alternatively if prices received increase by 22.5 percent, the full tenant would also attain a 6-percent ROE. At these prices, the farm does not participate in the Feed Grains Program and plants its full corn base

Table 7. Yield, Price, and Cost Changes for a 6-Percent ROE for a Northern and Central Illinois Cash-Grain Farm That Is a Full Owner with an Initial Debt-to-Asset Ratio of 20 Percent

	Initial projections	Desired level	Percent change
Return on Equity	3.0%	6.0%	100
Net Farm Income	$46,889	$78,000	66
Change Could be Achieved by:			
(1) Yield Increase			
Corn Yield	144	172	20
Soybean Yield	45	54	20
(2) Price Increase			
Corn Price	2.15	2.79	30
Soybean Price	5.89	7.66	30
(3) Expense Decrease			
Cost Reduction	$107,000	$80,250	25

Table 8. Yield, Price, and Cost Changes for a 6-Percent ROE for a Northern and Central Illinois Cash-Grain Farm That Is a Part Owner with an Initial Debt-to-Asset Ratio of 20 Percent

	Initial projections	Desired level	Percent change
Return on Equity	2.75%	6.0%	118
Net Farm Income	$33,211	$51,500	55
Change Could be Achieved by:			
(1) Yield Increase			
Corn Yield	144	172	20
Soybean Yield	45	54	20
(2) Price Increase			
Corn Price	2.15	2.74	27.5
Soybean Price	5.89	7.51	27.5
(3) Expense Decrease			
Cost Reduction	$80,000	$60,000	25

in corn. If costs are reduced by 16 percent, the ROE will also reach 6 percent. In all scenarios, net farm income must increase by approximately 47 percent in order to attain a 6-percent ROE. The percentage changes in Table 9 are smaller than the percentage changes in Tables 7 and 8. One must remember that the total amount of equity for the full tenant is considerably smaller than for the full owner and the part owner; thus, changes in income will have a greater effect upon the ROE.

Southern Illinois Cash-Grain Farm

Changes needed to attain a 6-percent ROE for a southern Illinois cash-grain farm are illustrated in Table 10. An average yield increase

Table 9. Yield, Price, and Cost Changes for a 6-Percent ROE for a Northern and Central Illinois Cash-Grain Farm That Is a Full Tenant with an Initial Debt-to-Asset Ratio of 20 Percent

	Initial projections	Desired level	Percent change
Return on Equity	1.38%	6.0%	334
Net Farm Income	$17,703	$26,000	47
Change Could be Achieved by:			
(1) Yield Increase			
Corn Yield	144	158	10
Soybean Yield	45	49.5	10
(2) Price Increase			
Corn Price	2.15	2.63	22.5
Soybean Price	5.89	7.21	22.5
(3) Expense Decrease			
Cost Reduction	$51,000	$43,000	16

Table 10. Yield, Price, and Cost Changes for a 6-Percent ROE for a Southern Illinois Cash-Grain Farm That Is a Part Owner with an Initial Debt-to-Asset Ratio of 20 Percent

	Initial projections	Desired level	Percent change
Return on Equity	1.25%	6.0%	380
Net Farm Income	$20,385	$41,000	101
Change Could be Achieved by:			
(1) Yield Increase			
Corn Yield	105	126	20
Soybean Yield	34	49.5	20
Wheat Yield	55	66	20
(2) Price Increase			
Corn Price	2.15	2.74	30
Soybean Price	5.89	7.51	30
Wheat Price	3.24	4.21	30
(3) Expense Decrease			
Cost Reduction	$65,000	$45,000	31

of 20 percent or a price increase of 30 percent will push the ROE percentage of this farm to 6 percent. Again, the farm will plant its entire corn base in corn and its entire wheat base in wheat if prices increase by that level. On the other hand, costs must decrease 31 percent in order to attain a 6-percent ROE. The differences in the rental arrangements and the initial ROE percentages between the southern and the northern and central Illinois grain farms may explain why the cost percentage is higher for southern Illinois grain farms. In all cases, net farm income for the southern Illinois grain farm must more than double to reach the desired ROE level.

In summary, smaller changes in prices, yields, and costs will have a greater effect upon the ROE for a full tenant than for a full owner due to the low equity position of a full tenant.

The increase in the value of land is often cited as a source of ROE; however, in these cases land values were assumed to remain constant.

Concluding Remarks

The economic scenarios presented in this paper were developed with the use of the Farm Business and Financial Management transition planning model. The results presented here are based largely upon FBFM averages for 1988, but the model can easily be applied to specific farms or to assumptions that differ from those used here. The model can be used on a microcomputer and is available through the IlliNet office.

Prepared by:
Kevin Koenigstein, Agricultural Economist, and
David A. Lins, Extension Specialist, farm financial management.

Issued by:

David A. Lins

David A. Lins

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 89-18 *December 1989*

The Projected Financial Condition of Illinois Livestock Farms, 1990-1993

Livestock production is an important part of Illinois agriculture. Many farmers have livestock operations to complement their grain production while others rely upon livestock enterprises for their entire source of net farm income. The purpose of this report is to examine the future financial prospects of typical Illinois livestock farms. The financial outlook for Illinois farrow-to-finish swine, dairy, and cow/calf beef enterprises is projected through the next four years using two initial debt-to-asset (D/A) ratios, 20 and 50 percent. Price projections, shown in Table 1, are based upon estimates from the Food and Agricultural Policy Research Institute (FAPRI) and Farm Business Farm Management (FBFM) data. Assumptions about farm size, yields, and cost are based upon averages for the FBFM record-keeping program.

In the following projections, production costs and crop yields are assumed to increase 2 percent each year. Interest rates are assumed to remain stable at 10.75 percent for long-term loans and 11.50 percent for operating loans. Real estate values, real estate taxes, and cash rents are assumed to remain constant over the next four years. In each farm scenario, the operator owns 50 percent of the tillable acres in the farming operation and rents the other 50 percent. Farm sizes and the numbers of livestock are based upon FBFM averages for that particular enterprise. Crop mixes reflect the feed requirements needed for each livestock enterprise.

The northern and central Illinois farms participate in the feed grains program in each of the four years. Each farm plants 90 percent of its corn base acres in corn, and 10 percent is left idle to satisfy the set-aside requirement. The ASCS corn program yield is assumed to be equal to the present corn yield of 123 bushels per acre. The soybean yield is assumed to be 39 bushels per acre, and the hay crop yield is 6.0 tons per acre.

The southern Illinois farms participate in both the feed grains and wheat programs. The ASCS corn program yield is assumed to be equal to the present yield of 105 bushels per acre. The ASCS wheat program yield is 45 bushels per acre while the actual wheat yield is 55 bushels per acre. The southern Illinois farms participate in the 1990 modified wheat program and plant 100 percent of the wheat acreage base. Otherwise, the set-aside requirement for wheat is 5 percent. The soybean yield is assumed to be 34 bushels per acre, and the hay crop yield is 6.0 tons per acre.

Each farm is assumed to own all livestock facilities and a complete line of machinery for row crop farming. The dairy and beef farms also own a line of haying equipment. Capital expenditures of $35,680 and $37,120 are made in 1990 and 1992, respectively, for the hog and beef farms. The dairy farms have capital purchases of $40,777 in 1990 and $42,425 in 1992.

Table 1. Commodity Prices Used to Project the Financial Condition of Illinois Livestock Farms

	Year			
	1990	1991	1992	1993
	dollars per bushel			
Corn				
Target	$2.75	$2.75	$2.75	$2.75
Cash	2.09	2.09	2.12	2.31
Loan	1.57	1.55	1.58	1.60
Deficiency	0.66	0.66	0.63	0.44
Soybeans				
Cash	5.32	6.14	6.01	6.10
Wheat				
Target	4.00	4.00	4.00	4.00
Cash	3.52	3.16	3.01	3.26
Loan	2.06	2.29	2.31	2.42
Deficiency	0.48	0.84	0.99	0.74
	dollars per cwt			
Hogs				
Market	44.12	41.55	40.56	43.74
Sows	38.88	36.50	35.58	38.52
Dairy milk				
Chicago area	11.54	10.98	10.42	9.86
St. Louis area	12.04	11.48	10.92	10.36
Beef				
Feeder cattle	85.00	86.00	84.00	82.00
Utility cows	51.00	52.00	51.00	49.00
	dollars per ton			
Feed				
Soybean meal (Decatur)	170.20	188.41	182.20	192.79

Estimates based upon Food and Agricultural Policy Research Institute (FAPRI) and Farm Business Farm Management (FBFM) data

In these simulations, net farm income is projected for each year of the four-year period. It is assumed that off-farm income equals $8,500 and that family living expenses equal $26,500 each year. These amounts reflect FBFM averages for 1988, and these figures are assumed to increase 2 percent each year. Each farm starts with a $10,000 cash balance and an initial debt level reflecting its D/A ratio. Initial and end-of-year operating loan balances, net worth, and D/A ratios are reported each year. The return on equity capital (ROE) ratio is calculated by first taking net farm income and subtracting an unpaid operator labor change reflective of the size of the enterprise. The result is then divided by the average of the beginning and the ending net worth for the year. The ROE percentage can be used to compare returns on farm investments with returns on nonfarm investments.

Northern and Central Illinois Hog Farms

The typical hog farm for this scenario is a 76-sow farrow-to-finish operation that farrows 142 litters of pigs each year with a weaning average of 7.7 pigs per litter. The operation sells over 1,000 head of market hogs per year. Each year, 38 gilts are kept as replacements to maintain a breeding herd of 76 sows. The hogs are fed a ration of corn produced on the farm and soybean meal supplement. The farm operates 340 tillable acres; 170 acres are owned and 170 acres are rented on a 50-50 crop-share lease. The farm has 171 acres of corn, 19 acres of set-aside, and 150 acres of soybeans.

Results of the four-year financial projections for northern and central Illinois hog farms with an initial D/A ratio of 20 and 50 percent are summarized in Table 2. Net farm income covers family living expenses in three of the four years for the farm with an initial D/A ratio of 20 percent. The ROE percentage remains low but stays positive during the four-year period. The operating loan balance is eliminated in the first year. Net worth increases while the D/A ratio declines from 20 to 15 percent.

Net farm income remains far below family living expenses for the farm with a 50 percent D/A ratio. The ROE is negative and the operating loan balance escalates. An increase in the operating loan balance indicates that net farm income, nonfarm income, and initial cash on hand are not sufficient during the year to meet family living expenses, principal payments, and down payments on capital purchases. Net worth declines and the D/A ratio increases over the four-year period.

Southern Illinois Hog Farms

The southern Illinois hog farm used in this scenario is similar to the northern and central Illinois hog farms. The southern Illinois hog farm also has a 76-sow farrow-to-finish operation that farrows 142 litters per year. The farm has 330 tillable acres; 165 acres are owned and 165 acres are cash rented at $75 per acre. The corn base is 150 acres; 135 acres are planted in corn and 15 acres are set-aside. The farm has 120 acres of soybeans and 60 acres of wheat.

Table 2. Projected Financial Condition of Northern and Central Illinois Hog Farms with Initial Debt-to-Asset Ratios of 20 and 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
D/A ratio, 20 percent					
Initial			15,000	457,200	20
1990	32,168	2.1	0	465,368	19
1991	27,532	1.0	0	466,105	18
1992	25,640	0.5	0	465,918	18
1993	30,792	1.5	0	471,036	15
D/A ratio, 50 percent					
Initial			37,500	285,000	50
1990	13,488	-3.1	36,163	279,988	51
1991	7,422	-5.6	52,642	266,316	52
1992	4,857	-7.1	77,596	251,483	56
1993	7,202	-6.7	100,611	239,235	56

Value of unpaid labor = $22,300.

The projected financial condition of the southern Illinois hog farm is illustrated in Table 3 and is similar to the results of the northern and central Illinois hog farms. Net farm income nearly equals family living expenses over the next four years for the hog farm with an initial D/A ratio of 20 percent. The ROE percentage remains positive while the operating loan balance is eliminated at the end of 1990. Net worth increases slightly after 1990 while the D/A ratio declines from 20 to 14 percent.

Net farm income is far below family living expenses for the farm with a D/A ratio of 50 percent. The ROE percentage is negative as the operating loan balance continues to build. Net worth steadily declines while the D/A ratio rises from 50 to 56 percent.

The results indicate the hog farms from northern and central Illinois and southern Illinois with a D/A of 20 percent will make some financial progress over the next four years. In 1990, these producers will benefit from low feed costs and higher hog prices. Lower corn prices help net farm income in two ways: 1) feeding costs are lower, and 2) the deficiency payment on corn is higher. In 1991 and 1992, net farm income will be reduced due to lower hog prices and higher soybean meal prices. In 1993, hog prices will recover, but soybean meal and corn prices will also rise.

Hog farm operators with a D/A ratio of 50 percent should consider making some changes in their farming operation. The producers should evaluate the potential for lowering production costs on the farm. Also, the operator should examine the possibilities of increasing off-farm income or reducing family living expenses. If possible, the operator may reduce or postpone the new capital expenditures scheduled for 1990 and 1992 if the repair expenses will not be considerably higher.

Northern and Central Illinois Dairy Farms

The dairy farm used in this projection has a 68-cow milking herd. The yearly average of milk production is assumed to be 16,000 pounds of milk per cow. Average production is assumed to increase from 16,000 pounds to 17,000 pounds of milk per cow by the end

Table 3. Projected Financial Condition of Southern Illinois Hog Farms with Initial Debt-to-Asset Ratios of 20 and 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
D/A ratio, 20 percent					
Initial			14,000	390,768	20
1990	30,322	2.0	0	397,600	20
1991	24,867	0.5	0	396,232	17
1992	23,441	0.1	0	394,659	18
1993	28,989	1.3	0	398,645	14
D/A ratio, 50 percent					
Initial			35,000	244,230	50
1990	14,422	-3.3	29,763	240,152	51
1991	8,013	-6.3	43,166	226,786	52
1992	5,996	-7.8	64,572	212,912	56
1993	9,059	-7.1	83,508	202,322	56

Value of unpaid labor= $22,300.

of 1993. Approximately 24 heifer calves are kept each year as replacements for the breeding herd, while the remaining 42 calves from the calf crop are sold at 200 pounds for $170 each. The producing cows are fed a ration of corn, dairy supplement, and silage. Unpaid operator labor is valued at $30,000 per year.

The farm has 291 tillable acres; 145 tillable acres are owned and 146 tillable acres are cash rented at $100 per acre. The crop mix is 102 acres of alfalfa for silage, 117 acres of corn for grain, 13 acres of set-aside, and 59 acres of soybeans.

Results of the four-year projections for northern and central Illinois dairy farms are given in Table 4. Net farm income is above family living expenses for the dairy farm with an initial D/A ratio of 20 percent. The ROE percentage is positive and the operating loan balance is reduced to zero. Net worth increases while the D/A ratio declines from 20 to 11 percent. This farm is projected to make good financial progress over the next four years. However, net farm income and the ROE percentage decline each year as milk prices are forecast to decline $0.56 per hundredweight each year.

Net farm income is below family living expenses for the dairy farm with an initial D/A ratio of 50 percent. The ROE percentage is negative while the operating loan balance escalates. Net worth declines while the D/A ratio remains at its initial level. This farm is projected to weaken in its financial condition during the next four years as milk prices decline.

Southern Illinois Dairy Farms

The southern Illinois dairy farm is similar to northern and central Illinois dairy farms with a milking herd size of 68. However, the southern Illinois dairy farm benefits from a milk price that is $0.50 per hundredweight higher than northern and central Illinois dairy farms. The southern Illinois dairy farm has 352 tillable acres; 176 acres

Table 4. Projected Financial Condition of Northern and Central Illinois Dairy Farms with Initial Debt-to-Asset Ratios of 20 and 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
D/A ratio, 20 percent					
Initial			10,200	504,065	20
1990	47,649	3.5	0	523,214	18
1991	45,897	2.9	0	536,994	15
1992	42,061	2.0	0	547,332	13
1993	37,690	1.1	0	554,440	11
D/A ratio, 50 percent					
Initial			25,500	315,040	50
1990	27,214	-0.8	23,566	313,754	51
1991	23,233	-2.3	31,554	312,849	49
1992	20,342	-3.4	49,046	309,911	51
1993	11,938	-6.5	77,453	298,966	50

Value of unpaid labor = $30,000.

are owned and 176 acres are cash-rented at $75 per acre. The crop mix is 102 acres of alfalfa for silage, 117 acres of corn for grain, 13 acres of set-aside, 60 acres of soybeans, and 60 acres of wheat.

Results of the four-year projections for southern Illinois dairy farms are illustrated in Table 5. Net farm income is above family living expenses for the 20 percent D/A ratio farm. The ROE percentage is 6.1 percent during the first year, but this percentage declines to 3.0 percent as milk prices decline. Net worth increases substantially while the D/A ratio is reduced from 20 to 9 percent. The results indicate that the 20 percent D/A ratio dairy farm will make good financial progress over the next four years.

The 50 percent D/A ratio dairy farm will make some financial progress over the next four years; however, some changes must be considered if the forecast for milk prices is a continued decline. Net farm income is above family living expenses as the ROE7 percentage is positive during the first three years. The operating loan balance declines initially, but the balance climbs back to its previous level. Net worth does increase as the D/A ratio declines from 50 to 42 percent.

Illinois Cow/Calf Beef Farms

The beef farm utilized in this scenario has a breeding herd size of 41 beef cows on 30 acres of nontillable pasture. Every year, the calf crop is assumed to be 39 head. Each year, 25 calves are sold as 450-pound feeders and 14 heifer calves are kept as replacements to the herd. The farm maintains a breeding herd size of 41 head of beef cows in each of the four years. The cattle are fed a ration of corn, beef supplement, and hay. The cows are allowed to graze on pasture during the summer months.

The farm size is 456 tillable acres; 228 tillable acres are owned and 228 tillable acres are rented on a 50-50 crop-share lease. The crop mix is 198 acres of corn,

Table 5. Projected Financial Condition of Southern Illinois Dairy Farms with Initial Debt-to-Asset Ratios of 20 and 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
D/A ratio, 20 percent					
Initial			10,200	441,600	20
1990	57,532	6.1	0	467,632	16
1991	55,667	5.3	0	488,881	14
1992	51,425	4.1	0	502,658	12
1993	46,764	3.0	0	514,672	09
D/A ratio, 50 percent					
Initial			25,500	276,000	50
1990	39,616	3.5	6,511	289,616	48
1991	36,495	2.1	4,545	297,490	44
1992	34,653	1.2	10,786	304,502	45
1993	27,598	-1.3	26,556	304,752	42

Value of unpaid labor = $30,000.

22 acres of set-aside, 216 acres of soybeans, and 20 acres of alfalfa for hay.

Results of the four-year financial outlook for Illinois cow/calf producers are presented in Table 6. Net farm income is below the amount needed for family living expenses for the cow/calf operation with a D/A ratio of 20 percent. The ROE percentage remains at zero while the operating loan balance persists. An operating loan balance means income is not sufficient to meet all cash obligations. Net worth steadily declines while the D/A ratio remains near its initial level. Although feeder cattle prices are forecast to remain over the $80 level, the beef enterprise contributes very little to the overall profitability of the farm firm. This beef farm is projected to make no financial progress over the next four years.

Net farm income is negative for the cow/calf farm with a D/A ratio of 50 percent. The ROE percentage is negative and the operating loan balance continues to escalate. Net worth declines substantially while the D/A ratio approaches 70 percent. This farm is projected to experience an eroding financial position over the next four years.

Conclusion

Based upon the price and yield assumptions used here, the financial outcomes for typical Illinois livestock farms will vary, depending upon the type of enterprise and the level of debt. Dairy farms appear to face the most promising future, while cow/calf operations seem to have the weakest prospects. However, changes in the commodity prices or costs used in the projections could significantly change future prospects.

The economic scenarios presented in this paper were developed with the use of the Farm Business and Financial Management transition planning model. The results presented here are based largely upon FBFM averages for 1988, but the model can easily be applied to specific farms or to assumptions that differ from those used in this paper. The model can be used on a microcomputer and is available through the IlliNet office.

For more information, call (217)333-0479.

Table 6. Projected Financial Condition of Illinois Beef Farms with Initial Debt-to-Asset Ratios of 20 and 50 Percent

Scenario/year	Net farm income	Percent return on equity	Operating loan balance	Net worth	Debt-to-asset (D/A) ratio, percent
D/A ratio, 20 percent					
Initial			14,300	552,800	20
1990	10,585	-0.8	3,853	545,285	22
1991	15,067	0.0	887	540,619	20
1992	15,743	0.0	3,180	534,890	23
1993	13,880	-0.4	9,577	526,661	21
D/A ratio, 50 percent					
Initial			35,750	341,750	50
1990	-12,263	-8.3	62,027	311,387	55
1991	-10,513	-8.7	98,637	282,514	58
1992	-12,736	-10.6	143,686	251,051	64
1993	-17,687	-14.4	197,495	214,262	68

Value of unpaid labor = $15,000.

Prepared by:

Kevin W. Koenigstein
Agricultural Economist

David A. Lins
Extension Specialist
Farm Financial Management

Issued by:

David A. Lins

David A. Lins

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

missing 90:8

Department of Agricultural Economics - College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-1 *January 1990*

Crop Production and Marketing Plans for 1990

Although you may have already taken steps to carry out your long-run crop plans, it could be profitable to take a careful look at prices, costs, and the provisions for participation in the feedgrain and wheat programs for 1990 to see whether any changes should be made in your 1990 cropping program.

Crop Production Strategies

You can determine the effect of different crop combinations (land use) on your 1990 farm income by making estimates of the costs and returns for each crop alternative. To prepare these, you will need to make three major judgments in terms of what you expect: (1) yields, (2) variable costs of production, and (3) market prices. These are based on the information you have at a given time. Past experience is helpful, but you must also look ahead.

Yields. Check your recent farm records. Base your projected target yield on typical or average yields for the practices and input levels you use. Consider the influence of moisture availability.

Costs. The typical variable and other costs of producing different crops are listed in Table 3. Use the data in the table as a guide for your costs.

Market prices. The next step is to estimate market prices. After this, you can determine the gross returns from the crops you plan to raise.

Commodity programs for feedgrain and wheat in 1990. The Food Security Act of 1985 covers crops produced through 1990. The requirements to qualify and the payment rates for benefits are presented in Table 1 for feedgrain and wheat crops.

The major changes for the 1990 programs from recent congressional positions are as follows:

1. The Omnibus Budget Reconciliation Act of 1989, which required the Secretary to reduce announced target price deficiency payments (in effect, reducing base target prices) by 2.33 cents for wheat, 2.33 cents for corn, and comparable amounts for other feedgrains. In addition, to meet the requirements of the Budget and Emergency Deficit Control Act of 1985, all cash program payments including price support loans will be reduced by 1.4 percent.

2. The Modified Wheat Option permits producers to plant up to 105 percent of these wheat bases with no ACR requirement. Program production payment acres eligible for deficiency payment are reduced for each acre of production above the permitted acre base up to 10 percent of the base.

In other instances, the general provisions for 1990 are similar to those in effect in previous years. These include those concerning deficiency rate determination, advance deficiency payments, acreage and yield bases, eligibility requirements for land set aside for acreage conservation reserve (ACR), 0-92 optional acreage diversion, option to substitute from 10 to 25 percent of base in soybeans or sunflowers, limited cross-compliance, payment eligibility, and payment limitation, as well as penalties for failure to comply with program requirements.

Wheat and feedgrain program sign-up will begin January 16, 1990, and continue through April 13, 1990. Producers must declare their intention to substitute 10 to 25 percent of each program crop's permitted acreage in soybeans or sunflowers by February 16, 1990. Specific requirements to qualify for program benefits for crops grown on your farm will be available from your county ASCS office.

Comparing Crop Alternatives

To help you select crop combinations that will optimize net crop returns, the contributions of individual crops at average expected yields, prices, and costs are presented in Table 2. An itemization of the cost of producing different crops is presented in Table 3. The "net return over variable cost" column in Table 2 indicates the marginal effects of acreage shifts on crop income. For instance, the net return of $197.75 over variable costs from a 145-bushel rotated corn crop sold at harvest for $2.30 per bushel is equal to the net return of $199 for a 45-bushel soybean crop sold at harvest for $6 per bushel if you are not participating in the reduced acreage program for corn.

Similarly, in evaluating possible participation in 1990 program alternatives for corn, you should compare the expected net returns from producing one acre of corn if you don't participate with the net returns from the composite corn-acre base of 0.9 acre devoted to corn production and 0.1 acre in ACR set-aside. Then compare those returns with the returns from using the optional 25 percent of permitted acreage in soybeans alternative, including production of 0.675 acre of corn, 0.225 acre of soybeans, 0.075 acre in ACR set-aside, and 0.025 acre of other nonprogram crop. Finally, evaluate the 0-92 participation alternative, in which up to 100 percent of the base is put into soil-conserving crops.

With harvest delivery prices being offered to farmers in early December of $2.30 per bushel for corn with an estimated $0.40 target price deficiency payment and $3.20 for wheat with an estimated $0.70 deficiency rate, participation in feed grain and wheat programs gives greater net returns for producers with typical yield and cost relationships. The advantage for participation is $21 per acre for corn ($219 versus $198) and $22 for wheat ($131 versus $108). Participation in the modified wheat program at 100 percent of base acreage has higher return than the original program ($136 versus $131). Double-cropping wheat land with soybeans or marketing straw reduces the advantage of participating in the wheat program.

The market price necessary for net crop returns to be equal for participation and nonparticipation can be calculated by dividing the sum of value of program crop production on permitted acres plus net production cost savings on idled acres by the bushels of program crop production on base acreage. With the data used in the crop return comparisons in Table 2, the break-even price is $2.50 per bushel for corn and $3.75 for wheat.

The substitution of soybeans on the corn base lowered net returns from crop at the level of prices, costs, and yields shown in Table 2. With higher soybean prices and/or lower expected corn yields, substitution of soybeans may appear attractive. This would be true of a farm with the major portion of the tillable crop land in the corn base, and corn yields would decrease on the continuous corn acreage.

When expected yields are at normal program production levels, participation in the optional 0-92 land diversion results in much lower net returns than any of the other alternatives for using the corn base acreage. Only owner-operators who have low yield expectations relative to yield payment levels and who can make substantial reductions in variable crop expenditures may profit from the 0-92 option.

Livestock producers considering participating in the program should compare the quantity of feed grains that could be raised on the idled acres required for participation to the amount of feed grains that could be purchased with the expected deficiency payments plus the crop cost saved by the idle acres.

The impact of participation in the 1990 feed grain and wheat programs on farm returns depends upon several factors that may vary with different situations. Three major factors are (1) expected market prices, (2) expected yields, and (3) the extent to which expenditures can be reduced by idling acres. Other factors include the yield levels that form the basis for payments for idled acres, the importance of advance payments and participation in the commodity loan program in meeting cash flow needs, and the availability of other profitable nonprogram crop production opportunities. In the case of wheat, another factor is the effect of participation on double-crop returns and straw returns.

Prepared by:

R.A. Hinton
Professor Emeritus
Farm Management

Issued by:

R. P. Kesler

R.P. Kesler
Extension Specialist
Farm Management

Table 1. Program Provisions and Payment Rates, 1990

	Corn	Sorghum	Barley	Oats	Wheat
Required acreage reduction (% of base)	10.0	10.0	10.0	5.0	5.0
Maximum permitted acreage (% of base)	90.0	90.0	90.0	95.0	95.0[1]
Target price	$2.75	$2.61	$2.36	$1.45	$4.00
Adjusted target price[2]	$2.727	$2.588	$2.34	$1.438	$3.977
Basic loan rate	1.96	1.86	1.60	1.01	2.44
Adjusted 9-month loan rate	1.57	1.49	1.28	0.81	1.95
Maximum deficiency payment rate[2]	1.157	1.098	1.06	0.628	2.027
Deficiency subject to payment limitation[2]	0.767	0.728	0.74	0.428	1.537
Projected deficiency payment rate	0.90	0.91	0.26	0	0.90
Advance deficiency payment rate[2]	0.337	0.342	0.084	0	0.337
Land diversion payment rate	NA	NA	NA	NA	NA

[1] Producers may plant up to 105 percent of their wheat base if they enroll in the modified wheat contract option.

[2] The 1985 Budget Reconciliation Measure requires the Secretary to reduce target price deficiency payments (in effect, reducing target prices) by 2.33 cents for wheat, 2.33 cents for corn, and comparable amounts for other feed grains. These reductions will apply to advance deficiency payments.

Table 2. Comparison of Crop Returns per Acre for Alternate Crop Options

	Acres	Production or base (bu or ton)	Harvest price or rate per unit	Crop return or payment	Variable cost[1]	Net return over variable
Corn						
Not participate, continuous corn	1.0	130	$ 2.30	$299.00	$148.00	$151.00
Not participate, rotated corn	1.0	145	2.30	333.50	135.75	197.75
Participate						
Corn	0.9	130.5	2.30	300.15	122.17	
ACR (deficiency for 0.9A)[2]	0.1	108	.40	43.20	2.00	
Composite base acre	1.0			343.35	124.17	219.18
Participate, soybeans on 25%						
Corn	0.675	97.88	2.30	225.11	91.63	
ACR (deficiency for 0.675A)[2]	0.075	81	.40	32.40	1.50	
Other nonprogram crop	0.025	--	--	--	0.50	
Soybeans	0.225	10.12	6.00	60.75	16.03	
Composite base acre	1.00		318.26	109.66	208.60	
Participate whole base, 0-92 option						
Corn	0.0					
ACR set-aside	0.1	--	--	--	2.00	
Optional conservation-use (CU) diversion[2]	0.9	99.36	.887[3]	88.17	18.00	
Composite base acre	1.0			88.17	20.00	68.17
Soybeans	1.0	30	6.00	180.00	63.00	117.00
		45	6.00	270.00	71.00	199.00
		54	6.00	324.00	81.00	243.00
Wheat						
Not participate	1.0	54	3.20	172.80	65.00	107.80
Participate, original program						
Wheat	0.95	51.3	3.20	164.17	62.10	
ACR (deficiency for 0.95A)[2]	0.05	42.75	0.70	29.93	1.00	
Composite base acre	1.0			194.10	63.10	131.00
Participate modified program[4]						
Wheat	1.0	54	3.20	172.80	65.00	
ACR (Deficiency for 0.9A)	0.0	40.5	.70	28.35		
Composite base acre	1.0			201.15	65.00	136.15
Double-crop soybeans	1.0	20	6.00	120.00	63.00	57.00
Wheat and double-crop soybeans						
Not participate	1.0			292.80	128.00	164.80
Participate, original program						
Composite base acre	1.0			307.80	122.80	185.00
Participate modified program						
Composite base acre	1.0			321.15	128.40	192.75
Oats	1.0	60	1.50	90.00	45.00	45.00
		80	1.50	120.00	48.00	72.00
		100	1.50	150.00	53.00	97.00
Hay	1.0	3.0	50.00	150.00	85.00	65.00
		4.5	50.00	225.00	100.00	125.00
		6.0	50.00	300.00	125.00	175.00

[1] Includes seed, pesticides, fertilizer, machinery repairs and fuel, drying costs, and interest on operating capital only.

[2] Quantity for payment is program yield times acres planted. Assume ASCS program yield of 120 bushels for corn and 45 bushels for wheat.

[3] Projected ASCS target prices deficiency payment rate less 1.4 percent Gramm-Rudman adjustment.

[4] Up to 105 percent of base may be grown with an acre-for-acre reduction of program production receiving target price deficiency payments.

Table 3. Estimated Costs per Acre for Producing Crops, 1990

	Rotated corn (145 bu)	Second year corn (130 bu)	Grain sorghum (120 bu)	Soybeans (45 bu)	Wheat (54 bu)	Oats (80 bu)	Double crop soybeans (20 bu)	Set-aside cover crop	Mixed alfalfa hay (4.5T)
Variable costs:									
Seed	$ 22	$ 22	$ 6	$ 10	$ 11	$ 8	$ 15	$ 4	$ 9
Pesticides	18	33	15	20	1	1	25	--	7
Fertilizer									
N	28	28	23	--	17	11	--	--	--
P, K, Lime	22	20	20	17	16	11	8	4	50
Machinery, repair, and fuel	24	24	22	20	16	14	127	30	
Drying fuels, repair	15	13	16	--	--	--	--	--	--
Interest on operating capital	7	8	6	4	4	3	3	1	4
Total variable costs	$136	$148	$108	$ 71	$ 65	$ 48	$ 63	$ 16	$100
Other costs:									
Machinery depreciation and interest	$ 40	$ 40	$ 38	$ 36	$ 30	$ 30	$ 20	$ 20	$ 50
Labor	21	21	20	20	10	10	10	7	30
Management	19	17	14	14	10	6	6	--	14
Storing (int. & bin)	28	25	22	18	13	12	8	--	34
Misc.	15	15	15	15	15	15	8	8	12
Total other costs	$123	$118	$109	$103	$ 78	$ 73	$ 52	$ 35	$140
Land costs (cash rent)	$100	$100	$100	$100	$100	$100	$ --	$100	$100
Total all costs									
per acre	$359	$366	$317	$274	$243	$221	$115	$151	$340
per bushel	$2.48	$2.82	$2.64	$6.09	$4.50	$2.76	$5.75	$ --	$75.55

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-2 *January 1990*

Roundtables Invite Public Discussion of 1990 Agricultural Legislation

Citizens from both farm and nonfarm backgrounds met in October and November 1989 to examine the far-ranging implications of the international economy for Illinois farm policy options.

Four Roundtables were sponsored by the University of Illinois Department of Agricultural Economics and the League of Women Voters of Illinois Education Fund, with support from the Land of Lincoln Soybean Association and the W.K. Kellogg Foundation. Leaders from the business community and the Cooperative Extension Services were invited to lead discussions.

The roundtables were held in Moline on October 28, Springfield on November 4, Carbondale on November 11, and Chicago on November 18.

Of the 149 people attending, 61 percent represented agricultural interests, including the Farm Bureau and Illinois Corn Growers Association, and 39 percent spoke on behalf of urban or nonagricultural organizations, including the Sierra Club, the League of Women Voters, and Bread for the World (Table 1).

Table 1. Roundtable Participation by Background

Location	Moline	Springfield	Carbondale	Chicago	TOTAL
Background:					
Agricultural					
Farmers	9	13	11	11	44
Other	19	9	9	10	47
	28	22	20	21	91
Nonagricultural					
Environmentalist	0	8	4	5	17
League of Women Voters	3	7	1	10	21
Other	4	3	3	10	20
	7	18	8	25	58
TOTAL	35	40	28	46	149
Percent of Purposes:					
Agricultural	80	55	71	46	61
Nonagricultural	20	45	29	54	39

Before the meetings began, Roundtable participants received briefing materials about agricultural and food policy issues. An opening speaker explained the policy environment for the 1990 "farm bill." Participants then broke into small groups to discuss specific topics for two hours. General policy questions provided the basis of discussion concerning the environment, international trade, commodity programs, and food programs. During lunch, participants reviewed the status of the 1990 federal agricultural legislation. In the afternoon, each discussion group presented its views, and the Roundtables ended with the entire group exploring all the issues.

Participants chose the topics they wished to discuss. Environmental issues related to agriculture attracted the most interest at all four Roundtables, and international trade and commodity programs were popular topics. Only Chicago participants showed sufficient interest to form a food programs group (Table 2).

Issues and Concerns

The purpose of the four Roundtables was to promote an exchange of views among Illinois residents from various backgrounds and to foster a more informed debate of agricultural policy by providing information about agricultural policy issues. Although group consensus regarding policy issues was not a goal, consensus did emerge around several points.

The Environment. Both farm and nonfarm participants were concerned about possible polarization of opinion around environmental issues. This motivated many to attend the Roundtables and to join the environmental discussion groups. They agreed that the potential for agricultural production to cause soil erosion and groundwater pollution is a problem for society, but they disagreed about the severity of the problem.

Many farmers are disturbed about environmental problems and the implications for their families, but at the same time they view current production practices as necessary for generating income. Other farmers are experimenting with alternative agricultural practices. Many farmers are skeptical of the public's understanding of the risks and benefits of agricultural chemicals and of consumers' willingness to pay more for food. Environmentalists not involved in farming offered their concern about the implications of current practices for the environment, and they said they would be willing to consider regulation if research and education fail. These participants would tolerate higher food prices if that were a consequence of changes in agricultural practices, but they also expressed doubt as to whether such price increases would be necessary. Many questioned whether or not market prices reflect the true costs to society of environmental degradation.

Table 2. Roundtable Participation by Discussion Group

Location	Moline	Springfield	Carbondale	Chicago	Total
	35	40	28	46	149
Discussion Topic:					
Commodity Programs	0	9	9	10	28
International Trade	13	9	6	8	36
Environment	22[a]	22[a]	13	18[a]	75
Food Programs	0	0	0	10	10

[a]Two discussion groups formed at this location.

In spite of this diversity of perspectives, a consensus emerged around two policy options for reducing the environmental side effects of agricultural production. First, participants agreed that further research is needed to generate more environmentally sound agricultural production and corresponding education and extension programs. Second, they agreed that more "flexibility" in the use of program base acres would allow farmers to adopt or experiment with environmentally sound cropping patterns. It was recognized that greater flexibility would reduce seed corn demand and might increase competition for nonprogram crop producers.

The discussion groups also generally supported the Conservation Reserve Program (CRP), but questions were raised about its current design. Farmers were uncertain about whether the 10-year contract provided enough security and flexibility. Some were also concerned about the effect on rural communities where a large portion of land enters the CRP. Some environmentalists felt that the program was not targeted precisely enough to achieve specific environmental goals.

Beyond these points of consensus, there was less agreement about policies appropriate for addressing environmental concerns. The groups spent a great deal of time discussing regulation of agricultural practices, and raised the following questions:

- Is regulation of agricultural practices necessary or desirable?

- Should the costs of adopting alternative practices be borne by farmers or shared by society?

- How should the standard be set for "acceptable" levels of soil erosion or chemical pollution?

- Do farmers have sole rights over their property?

- If regulation is part of a voluntary program, such as the current conservation compliance provisions, then how effective will it be when farmers leave the program?

- Would taxing agricultural chemicals be a more effective way to reduce their use?

- Should regulation focus on environmental goals or targets rather than on agricultural practices?

Both farmers and environmentalists voiced frustration with the complexities of these issues and disappointment over the short-term approach of agricultural legislation relative to the long-term nature of environmental problems. It was also recognized that environmental problems such as soil erosion and groundwater pollution are location-specific and will require targeted policies.

International trade. International trade topics attracted participants at all four Roundtables. The discussions ranged widely over a variety of related trade issues. Many participants expressed the need to learn more before making judgments about these issues, and the discussion groups provided a forum for education as well as communication.

It surprised the resource person for these discussion groups that the issue of a "level playing field" for agriculture is no longer the most important issue to the public. There is more recognition that all countries have trade-distorting policies, including the United States, and that free trade will be a difficult goal to achieve.

Other issues raised in the trade groups include:

GATT negotiations. Is GATT an appropriate institution for regulating agricultural trade? Will the United States be forced to relinquish control over agricultural policy if negotiations within GATT are successful? How can protectionism and subsidized exports from the European Community be reduced?

Export promotion. How can value-added (i.e., processed) agricultural exports be promoted? How can we learn more about overseas markets and tastes? Would more flexibility in the use of program base acreage allow farmers to respond to overseas market opportunities?

Developing countries. How do food aid and agricultural export subsidies affect developing countries? Do they reduce prices that local producers receive in these countries? How does U.S. agricultural technology affect developing countries?

Supply management vs. free trade. Is supply management or free international trade better for U.S. agriculture? Does set-aside acreage reduce U.S. world market share?

Export subsidies. Are export subsidies a worthwhile way to spend taxpayer money? Who benefits from export subsidies?

Commodity programs. Although the 55-year-old commodity programs are the core of federal agricultural legislation, this topic attracted relatively few participants and the fewest nonfarm participants. The complexities of these programs are perhaps a barrier to nonfarm interest, and farmers themselves were more concerned about more recent provisions relating to environment and international trade. Nevertheless, the commodity program discussions at three sites reflected a variety of opinions within the farming and agribusiness sector.

The commodity programs groups tended not to focus on the specifics of altering current programs, but rather on the general effects and philosophy of these programs. There was a strong sentiment to support the "family farm," while recognizing that there is no single definition of the family farm. The question was asked whether policies could maintain a middle-class of commercial farms.

Market distortions and current program costs were a concern, but many expressed the feeling that these are justified by the need to maintain a reserve of surplus capacity for producing food. Relatively cheap and abundant food is seen as an outcome of past farm policies. However, the groups generally agreed that greater flexibility in the use of program base acres would benefit farmers and perhaps encourage more sustainable agricultural systems.

Food Programs. Food programs were discussed only at the Chicago Roundtable. Although a political coalition of the hunger lobby and the farm lobby operates at the national level, the connection between food issues and agricultural issues was less apparent at this grassroots level. Hunger is only one of many related problems faced by needy families, and the group agreed that separating hunger programs from agricultural legislation would make sense in the long run. Distribution of food commodities, for example, should not be tied to the level of surplus stocks.

The discussion of whether or not to pay food stamp benefits in cash centered around the adequacy of benefits and whether or not benefits should come with strings attached. The group was divided on the extent to which government programs should determine the decisions of needy households, but strong concern was expressed over the inadequate level of current benefits. Food stamp and other welfare benefits have declined in real terms in recent years.

Tying food stamps to food purchases was a minor issue compared to the overall needs of poor households. The problems of the needy include unemployment, insufficient food, lack of medical care, inadequate nutrition education, and the high cost of housing. Furthermore, access to food and other welfare programs is difficult, due, for example, to lack of information and transportation.

Participants' Reactions

Participants who completed evaluations (52 percent) deemed the Roundtables a worthwhile experience: 85 percent said they enjoyed the opportunity to hear others' opinions, 74 percent appreciated new information (Table 3).

Over two-thirds responded affirmatively to the question, "Do you feel that the discussions today affected your perspective on the issues?" Four participants wrote:

> "Yes, I feel that people outside the agriculture community are more open-minded about environmental problems than I thought. We must continue to communicate with all segments of society."

> "I better appreciate the farm point of view and recognize that farmers are concerned about many of the same issues that I am."

"I have a greater understanding of how farmers' hands are tied by participation in the farm commodity programs so that change to a more sustainable system is less likely."

"I didn't really understand trade policy. Now I have a better idea of what is taking place."

By providing a forum for exchange of ideas among citizens of different perspectives, the project seems to have met a need for greater communication.

Future Project Activities

During 1990, the project staff are ready to support further efforts by individual organizations to educate and communicate about the issues for the 1990 agricultural legislation. Those who wish to make use of the project's educational resources should contact Dr. Laurian Unnevehr, 305 Mumford Hall, 1301 West Gregory Dr., Urbana, IL 61801, phone (217)333-3049.

A conference to discuss the outcomes and implementation of the 1990 agricultural legislation will be held in February 1991. State leaders, academics, and government officials will be invited to discuss the implications of the 1990 act and alternative policies for implementation.

Prepared by:

Laurian J. Unnevehr
Agricultural Economics

Issued by:

Laurian J Unnevehr

Laurian J. Unnevehr

Table 3. Participants' Evaluations

Location	Moline	Springfield	Carbondale	Chicago	TOTAL
			(percent of responses)		
Participation Worthwhile for:					
Others' Opinions	76	81	82	92	84
Information	88	63	55	79	74
Share Own Views	71	50	73	75	68
Speakers	65	69	45	42	54
Participation Affected Perspective:	53	63	91	75	69

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-3 *March 1990*

Alternative Strategies for Controlling Economic Risk in Corn Production for 1990

Following the droughts of 1988 and 1989, increased emphasis has been placed on insuring against the chance of severe economic losses in crop production. In this paper alternatives for reducing economic risk are examined using historical yields and an expected distribution for the average market price of corn in 1990.

Figures 1 to 4 take a farm case study approach to indicate how multi-peril crop insurance (MPCI), participation in the government acreage reduction program (ARP), and the combination of these two options can reduce the risk of low returns for corn producers. Both figures are based on a distribution of corn prices ranging from $2.00 to $2.60 with a mean of $2.24 per bushel. The yields are actual historical yields, taken from 1982 to 1987, for farms in Macon and Wabash counties in Illinois. These two farms were selected from more than 1,000 farms in the Farm Business Farm Management Association based on having median per acre incomes for their respective regions during the six-year period.

In these examples, it is assumed that an individual producer's yield does not affect the market price. Correlations between corn and soybean yields and prices were calculated from more than 1,000 farms for the years 1982 to 1987. The individual farm correlations were found to be insignificant during this period. However, certainly in years of widespread disasters, such as 1988, higher prices generally occur with the lower yields nationwide.

The price and yield distributions used in these examples are not predictions for 1990, but they serve to demonstrate the risk that producers may face. The prices, yields, costs, and MPCI values used for the two different farms are shown in Table 1. The variable costs change with yield, but are based on $138 per acre for a yield of 135 bushels per acre.

Table 1. Rate Assumptions Used in the Two Farm Cases

	Macon Farm	Wabash Farm
Average yield, 1982-1987 (bu/ac)	150.36	118.64
Minimum yield (bu/ac)	85.59	57.96
Maximum yield (bu/ac)	183.94	145.60
ASCS yield, county average (bu/ac)	132.70	100.60
Estimated APH yield (bu/ac)	143.30	111.04
Yield selection	.75	.75
Price selection	$2.30	$2.30
MPCI premium	$5.69	$11.11
Fixed costs	$165.00	$125.00

An Example for Central Illinois

Participation in the government acreage reduction program is one form of insurance against low returns. The government price support program provides both yield and price protection. However, the producer has to forego plantings on 10 percent of his base acreage.

Figure 1 shows the distribution of per acre returns above all costs for the base case and participation in the government acreage reduction program for the case farm in Macon County. If this individual does not participate in the government program, the distribution of returns ranges from -$120 to $140 per acre. Ranges and probabilities associated with these examples are also shown in Table 2.

The individual who participates in the government program may receive returns of -$67 to $129 per acre. Except for the very small chance of returns above $129 (less than 1 percent), this distribution is consistently to the right of the one for the person who does not choose to participate in the acreage reduction program. Most individuals would prefer the distribution of returns depicted on the right because it shows substantial reduction in the risk of lower returns.

For the case of not participating in the ARP, the probability of negative returns is approximately .25. In other words, this farmer has a 25 percent chance of incurring losses and a 75 percent chance of reaping positive profits. Likewise, there is a 17 percent chance that the losses will exceed $60 per acre. On the other hand, a 23 percent chance exists for profits above $60 per acre.

By participating in the ARP, there is an 18 percent chance of per acre losses above both fixed and variable costs, and only a 3 percent chance that the losses will exceed $60 per acre. Moreover, there exists a probability of approximately .64 that the net returns will exceed $60 per acre.

Figure 2 shows the protection that MPCI provides for the producer. The distribution on the left represents the expected returns from producing an acre of corn and purchasing MPCI. The distribution on the right indicates the reduction in risk by participating in the acreage reduction program and purchasing MPCI. The returns for nonparticipation in ARP range from -$76 to $134 per acre while those for the case of participating in both ARP and MPCI range from -$27 to $123. MPCI alone provides considerable downside risk protection versus the first scenario in Figure 1. Purchasing crop insurance

Table 2. Case Farm Corn Returns and Probabilities of Corn Returns

			Probability of Per Acre Returns			
	Minimum	Maximum	< -$60	< $0	> $0	> $60
Central						
Basic corn	-$120	$140	0.17	0.25	0.75	0.23
Corn ARP	-$ 67	$129	0.03	0.18	0.82	0.64
Corn MPCI	-$ 76	$134	0.11	0.30	0.70	0.17
Corn ARP MPCI	-$ 27	$123	0.00	0.17	0.83	0.55
Southern						
Basic corn	-$ 98	$124	0.17	0.20	0.80	0.23
Corn ARP	-$ 60	$114	0.01	0.17	0.83	0.72
Corn MPCI	-$ 51	$113	0.00	0.18	0.82	0.17
Corn ARP MPCI	-$ 18	$104	0.00	0.15	0.85	0.39

Note: *ARP* indicates participation in the 10 percent acreage reduction program in 1990, and *MPCI* indicates that multi-peril crop insurance is purchased at the rates given in Table 1.

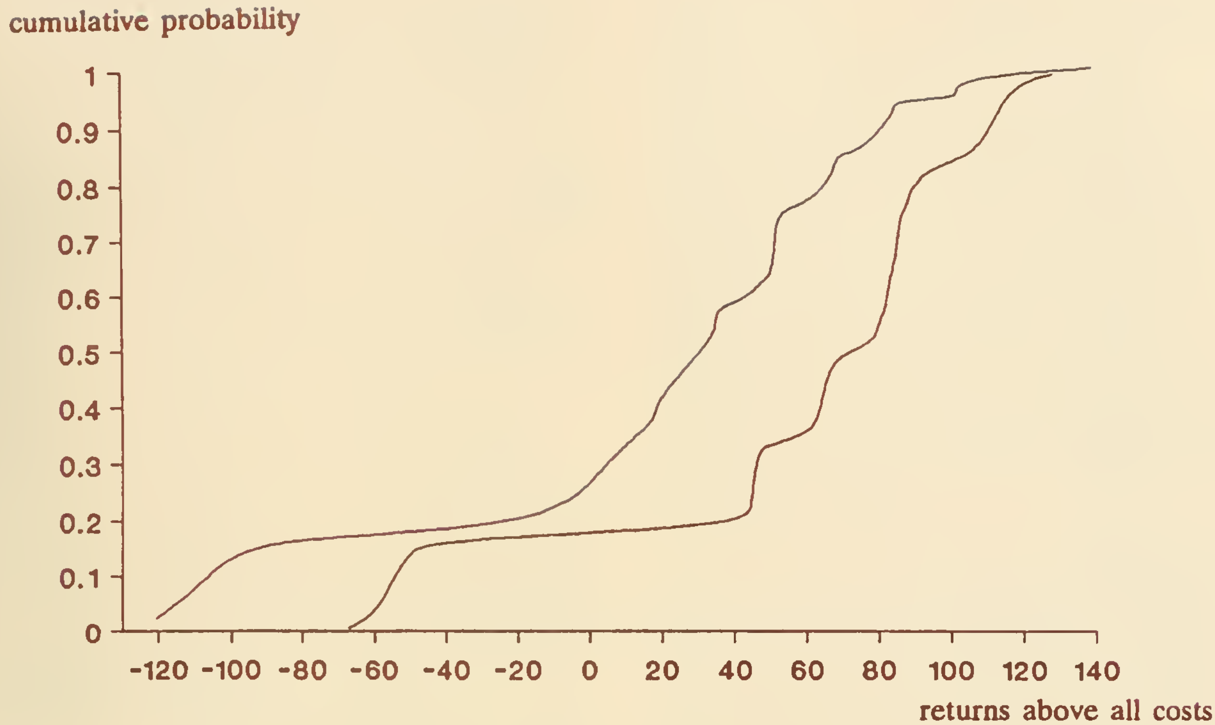


Figure 1. Expected per acre returns for corn in Central Illinois with no programs and with the acreage reduction programs.

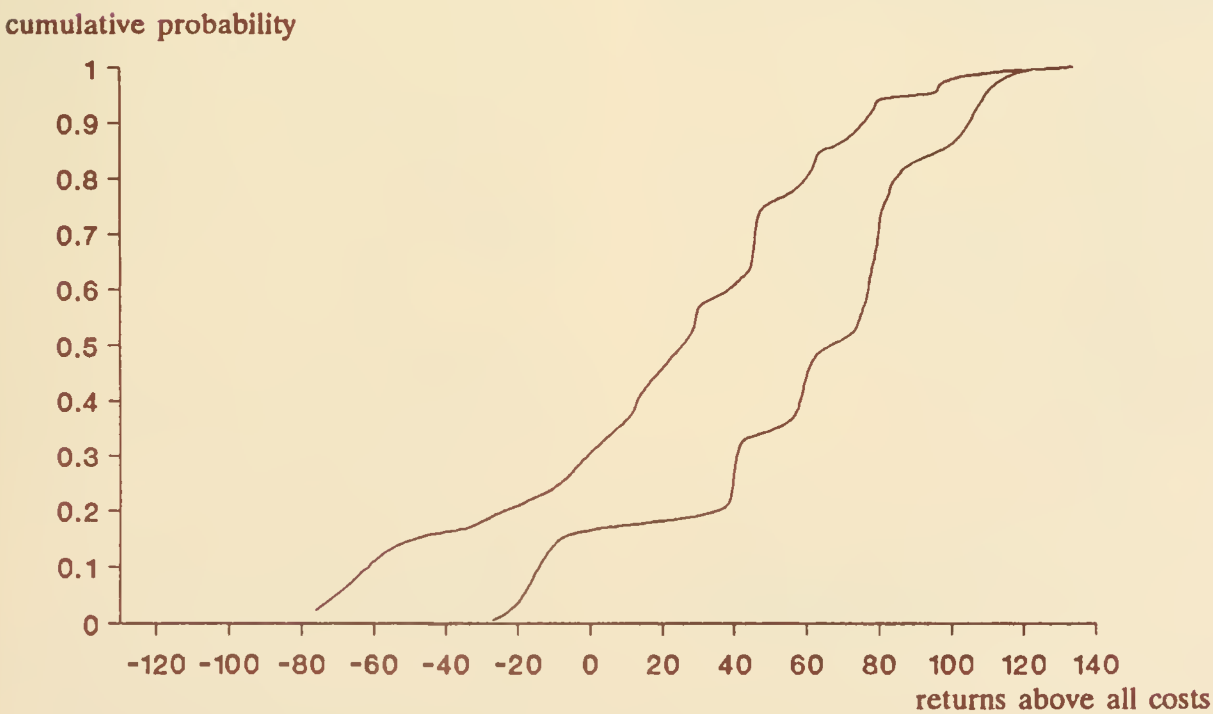


Figure 2. Expected per acre returns for corn in Central Illinois with MPCI only and MPCI and the ARP.

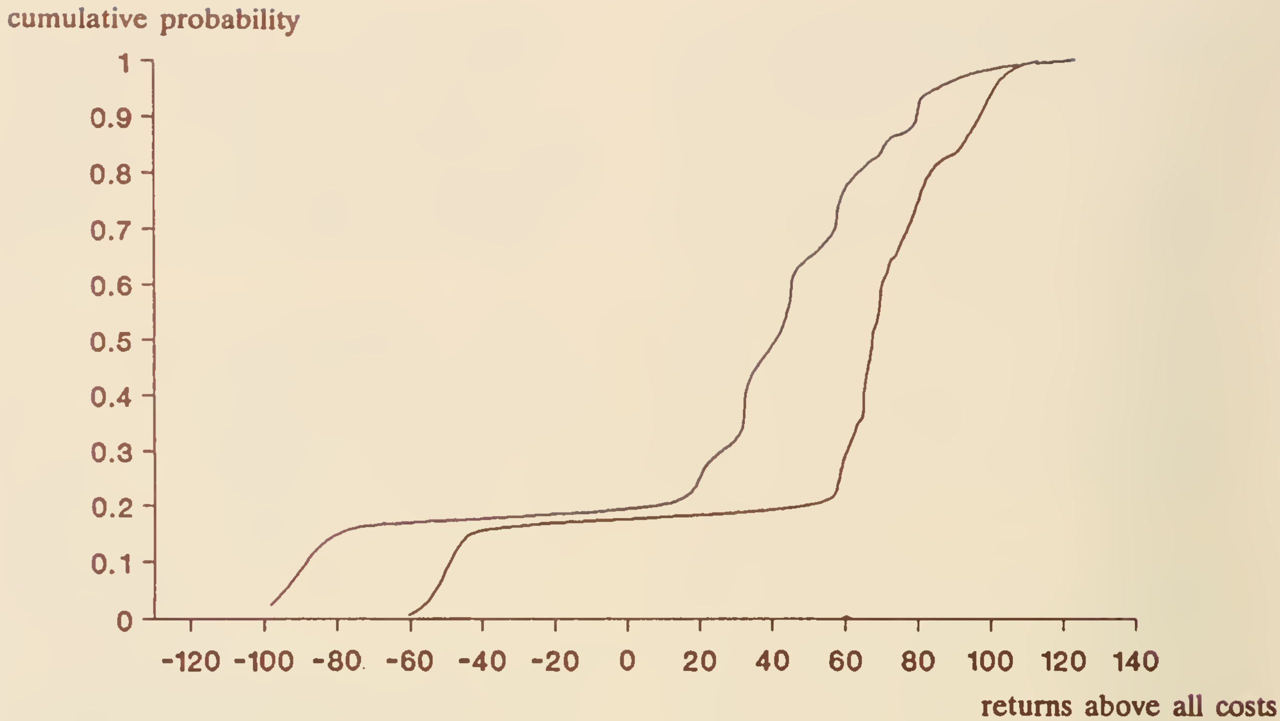


Figure 3. Expected per acre returns for corn in Southern Illinois with no programs and with the acreage reduction programs.

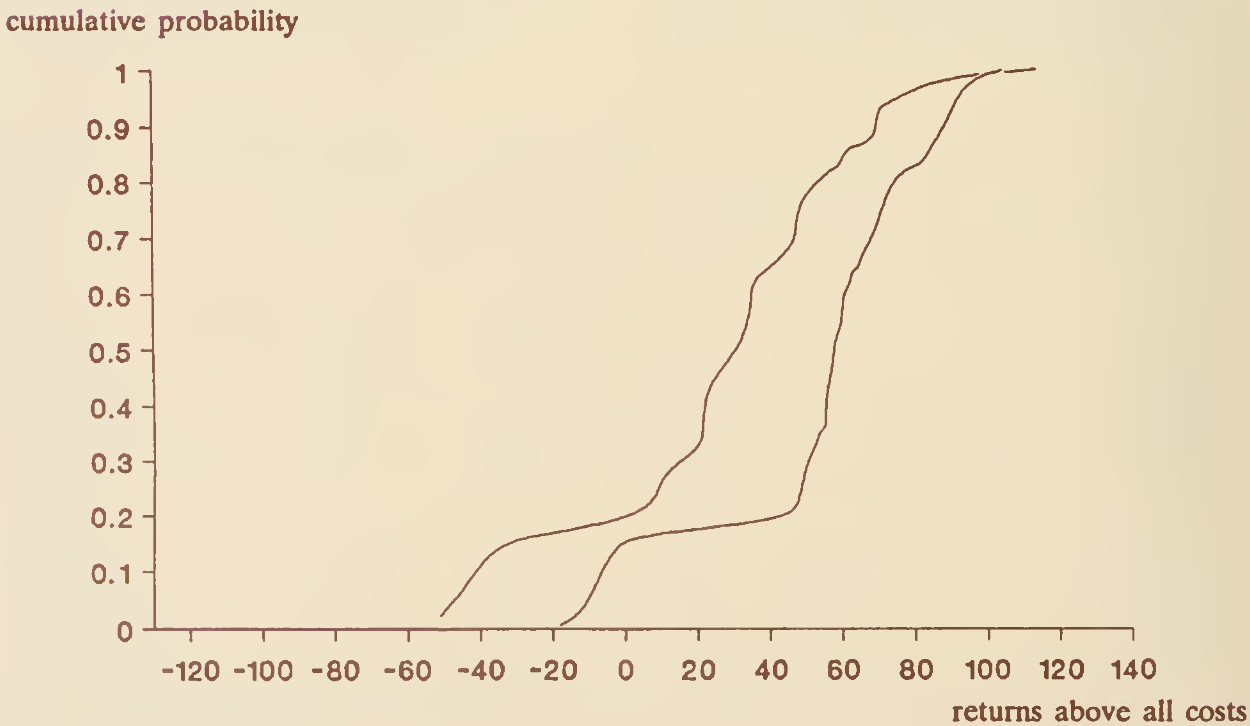


Figure 4. Expected per acre returns for corn in Southern Illinois with MPCI only and MPCI and ARP.

eliminates a 16 percent chance that losses will exceed $80 per acre, at a cost of $5.69 per acre. However, participation in the acreage reduction program (the distribution on the right in Figure 1) provides more risk reduction than the use of MPCI alone. The combination of the acreage reduction program and MPCI provides the best protection against low returns of any of the above-mentioned strategies. With MPCI and participation in the ARP, losses are limited to approximately $27 per acre. The probability of the higher returns is somewhat less, however, than with only the acreage reduction program.

The Southern Illinois Example

The price distribution used for the following examples for the Wabash County farm is the same as for the Macon County farm, but the yields, fixed costs, and insurance premiums are altered as shown in Table 1. The risk reduction provided by the government acreage reduction program and multi-peril crop insurance for this farm is similar to the risk reduction for the Macon County farm. Both provide protection against the chance of losses, but with MPCI, more upside potential is given up due to the higher premium in the southern region.

Distributions of returns from the Wabash County farm for basic corn production and participation in ARP are shown in Figure 3. Without price and yield protection strategies, the returns may range from -$98 to $124 per acre. Participation in ARP reduces the outcomes to a range of -$60 to $114 per acre. Furthermore, with the ARP, a 72 percent chance exists that returns will exceed $60 per acre. Under the base case there is only a 23 percent chance of those outcomes.

Multi-peril crop insurance (Figure 4) reduces the downside risk by another $9 over the ARP, and the highest return is $113 per acre, which is $1 less than with the ARP. The chance of returns above $60 per acre, however, is much lower--only 17 percent. As in the Macon County case, purchasing MPCI and participating in the ARP significantly reduce the uncertainty of the returns above variable and fixed costs (-$18 to $104 per acre). In order to reduce the downside risk by $90, the producer must sacrifice $20 at the upper end of the distribution.

Summary

These examples should help producers understand the tradeoffs involved in the decision to buy MPCI. It should be understood that individual producers must decide how much risk to accept. The examples presented here have only examined the financial risk associated with corn production. Fewer options exist for soybean producers because an acreage reduction program and deficiency payments are not available for soybeans. However, given the risk reduction provided by the ARP for corn, a practical whole farm strategy for the corn/soybean producers might be to participate in the ARP for corn and purchase MPCI on the soybean acreage.

Multi-peril crop insurance and participation in the government acreage reduction program are certainly not the only options available to farmers interested in controlling risk. Other strategies include enterprise diversification, use of forward contracts, futures and options, and self-insuring by maintaining adequate liquidity. As shown in these examples, choosing not to insure and therefore taking more risk may provide an opportunity for slightly higher returns, but individuals who choose to accept the additional risk should be prepared to accept the consequences of low returns resulting from that decision.

Prepared by:

Robert H. Hornbaker
Extension Specialist
Farm Management

Issued by:

R. P. Kesler

R. P. Kesler
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-4 *April 1990*

Is Experience a Good Teacher for No-Till Farmers?

One widely held belief in American society equates experience with learning. Experience, it is said, is a good teacher. It facilitates future learning, helps in reducing errors or eliminating problems, and improves performance by expanding one's knowledge base. This belief has been basic to the introduction of new agricultural technologies and practices. With the passage of time and the accumulation of experience, many early problems and uncertainties diminish and farmers' perceptions of innovations change. In this report, we will present evidence that relates farmers' experience with no-till to their perceptions of it. Do those farmers with longer histories of no-till farming view no-till differently in relation to conventional tillage and in terms of its benefits? Research experience with other agricultural technologies suggests that they should.

No-Till Farming in Illinois

No-till farming is one type of reduced tillage that has been introduced, primarily for soil conservation, into agriculture in the Midwest. Other benefits have been promised as well, which has broadened its appeal to farmers. Although no-till has been around for decades, it has not been widely adopted by farmers. Soil Conservation Service (SCS) figures for 1982 indicated that only 3.6 percent of Illinois farmland was in no-till. SCS estimates as recent as 1988 indicate that slightly more than 1.5 million acres have been planted in no-till in Illinois, up from 0.39 million in 1977. This increase amounts to an average 25 percent per year. This annual increase is sizeable, but it still involves relatively few farms. In Illinois, it is estimated that approximately 35 percent of the tillable acres are suited for no-till and another 31 percent are suitable for an alternative form of conservation tillage practice.

The primary thrust behind the introduction of no-till is ostensibly to reduce soil loss. By planting directly into soil that is undisturbed in the spring and maintaining crop residues on the surface throughout the year, soil loss is greatly reduced. It is understandable then that no-till is being promoted by agencies charged with protecting America's natural resources. A state summary for Illinois indicates that no-till and other conservation tillage practices have the potential to reduce soil erosion and maintain near-equivalent crop yields when careful consideration is given to individual soils. Furthermore, it is estimated that a 65 percent reduction in soil loss can be achieved if 20 percent of the crop residue is left on the field. This estimate indicates the potential that conservation tillage, including no-till, has for reducing soil erosion in Illinois, yet Illinois farmers do not come close to utilizing no-till on the acres most suited for it.

No-Till Claims

If conservation benefits and water quality only were considered, no-till would be considerably less appealing to some Illinois farmers. Farmers, however, have also begun to look for ways to cut production costs. No-till promises benefits on both counts, although most clearly in the area of soil conservation.

STATE• COUNTY •LOCAL GROUPS •U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

Over the past two decades, research and discussions have focused on many different aspects of no-till: its advantages in terms of reduced soil loss and erosion, improved water quality, moisture retention, reduced labor inputs, fuel savings, timely planting, and some of the still problematic areas such as weed and insect control and reduced yields. Presently, the case for no-till hinges on two important related considerations: whether it saves farmers money and whether it reduces soil loss. Proponents prefer to think it does both, while skeptics argue that the economic benefits have yet to be demonstrated. Research results are equivocal, causing differences of opinion on the costs and effectiveness of no-till.

The economic implications of no-till are difficult to document accurately, and will undoubtedly continue to change with advances in the understanding of no-till and agricultural technologies. There are still many uncertainties about the appropriateness of no-till agriculture under different conditions, its economic returns, and even its long-term environmental desirability because of its reliance on chemicals for weed and pest control. Because of these uncertainties, no-till is gaining acceptance slowly among farmers and is viewed warily by many persons who could recommend its use.

Time, Experience, and Learning

Over time, agricultural innovators accumulate experience with new technologies and practices, adapt, and experiment. The resulting information, insight, and information from research become the farmer's knowledge base. This knowledge base affects the acceptance and spread of an innovation on the farmer's land or on the land of other farmers with whom he is in contact.

Long-term users of no-till have accumulated local experience and knowledge and will probably view it differently than more recent adopters. Farmers who are learning by doing, eliminating or reducing risks, and becoming more efficient in utilizing resources will, in general, become more effective. Because this occurs over time, farmers should change their prior perceptions and beliefs on the basis of observed performance.

Experience will probably become a primary teacher of no-till to farmers because of the differences between no-till and conventional tillage, the difficulty in assessing no-till research, and even some disagreement between agencies to whom farmers often turn for advice. No-till is different from the conventional tillage that most farmers grew up with and are familiar with, as the data at the bottom of this page shows. Farmers clearly do not view conventional and no-till as being similar.

Farmers argue that no-till requires more management skill, a more extensive knowledge of chemicals and their application, and familiarity with and adoption of new equipment. They also believe that no-till farmers must be able to manage crop residues, maintain proper seeding depth and fertilizer placement, apply pesticides in proper amounts and locations, learn how to control grasses and select seed varieties, and adapt to different soil types and conditions.

Because much of the farmer's knowledge base has come from the use of conventional tillage, there is, initially at least, a certain amount of risk and need for adaptations. This uncertainty is underscored by a description of reduced tillage as an "experimental frontier" where the farmer needs to "find out what works for him." No-till conferences, trade magazines, and farmer testimonials are being

No-till farmers responding that no-till and conventional tillage are "about the same" on . . .

	Percent		Percent
Overall production costs	49	Fuel costs	3
Chemical costs	11	Controlling erosion	4
Risk	32	Need for timely operations	19
Required management skills	10	Fertilizer costs	80
Net income per acre	50	Equipment costs	3

used to close the gap in knowledge among farmers and to convey farmers' personal experiences. As one farmer commented, though, "There is a need for a standard affordable formula."

This research focuses on no-till farmers who vary in their length of experience with no-till. They were asked numerous questions about their perceptions of no-till's characteristics as well as how it performed on their farms. If farmers learn by doing and accumulate information with experience, this experience should provide them with more knowledge and/or insight into the utilization of no-till. As a result, farmers with longer exposure should have different perceptions of and more success with no-till than those farmers who have begun using it recently.

Findings on Experience and Perceptions

The results reported here are taken from a study of 203 no-till innovators in the state. These persons were among the first no-till farmers in their counties. They were identified through contacts with SCS and the Cooperative Extension Service and from leads provided by other farmers. Altogether, farmers in 20 counties, 10 in the northern two-thirds of the state and 10 in the southern third, were interviewed. Because innovators were defined as being the "earliest in their counties," the length of time farmers have been using no-till ranges from three or four years to over two decades. In Figure 1, we have grouped years of experience with no-till and looked at the percentages of farmers responding to the statements:

Compared with conventional tillage, no-till

a. requires *more* management skill.
b. involves *greater* risk.
c. requires *making* more crucial decisions.
d. requires *more* timely operations.

In all the cases, we look at the percentages reporting that no-till requires *more* management skill and involves *more* risk, *more* crucial decisions, and *more* timely farming operations, based on their experiences. If experience has some cumulative benefit, farmers who are familiar with no-till and have been using it for a longer period should have different responses to it as a tillage practice.

As you can see, the findings do not necessarily square with the reasoning, and in some cases they are contradictory. For example, while there seems to be an expected downward trend in farmers' perceptions about

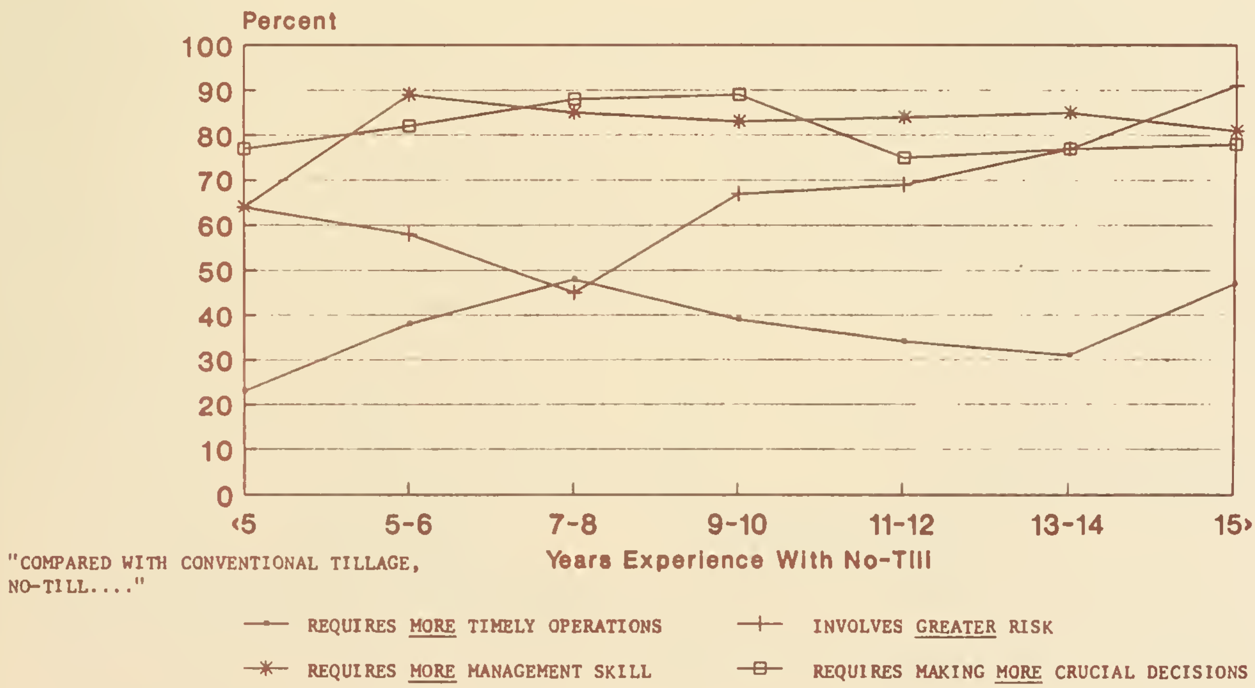


Figure 1. Farmers' perceptions of no-till by length of experience.

no-till requiring more timely farm operations, the trend is the opposite for perceptions of risk. In fact, those familiar with no-till for a longer period have a higher perception of risk. On the other two characteristics—no-till requiring *more* management skill and making *more* crucial decisions—the lines are relatively flat, indicating that experience doesn't have much effect on these two perceptions.

In Figure 2, we have again grouped years of experience with no-till and looked at farmers' assessments of no-till benefits. The graph represents the percentages of farmers responding to the statements:

Compared with conventional tillage,

a. no-till is *more effective* in improving farm income.
b. per-acre income is *higher* with no-till.
c. production costs are *lower* with no-till.
d. corn yields are *higher* with no-till.

In Figure 2, the results are again equivocal on the relationship between experience with no-till and perceptions of its benefits. With the exception of farmers' perceptions about improved farm income, there is a general downward trend, suggesting that experience has had a modest effect. In the case of corn yields, experience with no-till translates into a more pessimistic perception. In the case of farm income, after an initial drop for those using no-till for five to six years, there is a slight and gradual increase in the perception that no-till improves farm income. A factor here may be the almost universal perception that no-till controls soil loss, prevents erosion, and cuts fuel costs. Thus, while farmers are more hopeful when looking at no-till in relation to overall income, they are more equivocal and vacillating on specific benefits.

Discussion

There is not much evidence that farmers' length of experience with no-till has altered their perceptions about its being more risky, demanding, and complex than conventional tillage. Nor does experience seem to affect perceptions of how well no-till performs relative to conventional tillage. No-till may continue to be somewhat problematic for farmers, especially if its use is limited to small acreages. Uncertainty among researchers and a lack of consensus among agency personnel are also problems for farmers.

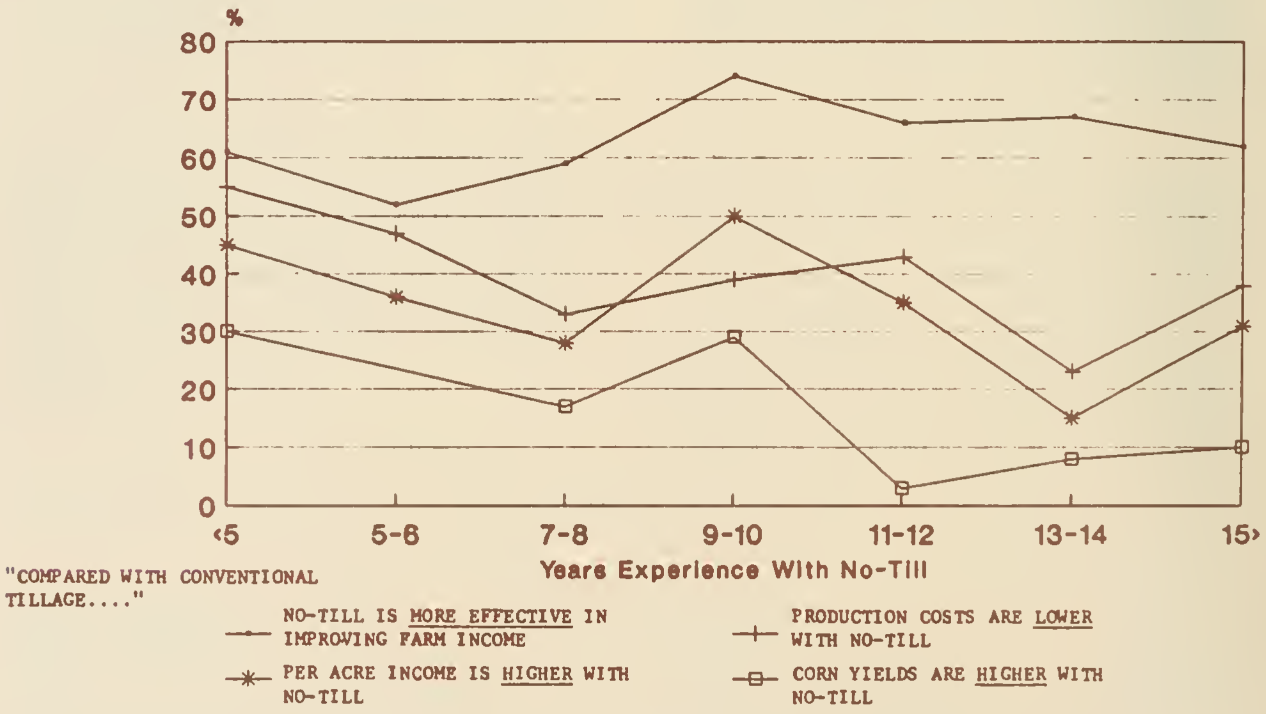


Figure 2. Farmers' assessment of no-till benefits by length of experience.

Research results have confused farmers having to make no-till decisions. Numerous claims have been made for no-till, from conserving soil to reducing energy consumption and sedimentation. Research has focused on just about every aspect of no-till, but some of the research is contradictory and contrary to what farmers actually experience. Profitability is difficult to prove, although research on no-till use suggests that yields improve with the number of years a farm has been in no-till. In some cases, farmers' own experiments have outpaced research. Researchers often hesitate to make recommendations and are surprised at farmers' findings based on their experience. Ultimately, however, receptivity to conservation tillage will depend on farmers' commitment to saving soil and their perception of no-till's profitability.

Our research has also shown that the Cooperative Extension Service and SCS are not in complete agreement about no-till. Claims and counterclaims, research discrepancies, and farmers' experiences have caused differences of opinion among agency staff. There is not complete disagreement, however, because there is near unanimity regarding the effectiveness of no-till in controlling erosion and on its environmental benefits (Table 1).

Table 1. Selected Areas of Agreement and Disagreement on No-Till by Agency

	Percent in agreement with statement	
	CES	SCS
Area of agreement on attitudes toward no-till:		
1. No-till is *more effective* than conventional tillage in controlling soil erosion.	96	96
2. No-till requires *more* management skill than conventional tillage.	97	91
3. No-till requires *more* crucial decision-making than conventional tillage.	88	79
4. No-till is *not* a passing fad.	98	98
5. Fuel costs are *lower* with no-till compared with conventional tillage.	96	98
Areas of disagreement among agency staffs:		
1. Maintaining yield levels is *more* of a problem with no-till than conventional tillage.	62	20
2. No-till involves *greater risks* than conventional tillage.	74	53
3. No-till is *better* at improving farm income than conventional tillage.	14	33
4. Weed and grass control is *more* of a problem with no-till than conventional tillage.	87	53
5. Enough is *already known* about no-till to get wider use than there is presently in the county.	72	88

Most staff also agree that no-till requires greater management skills and involves more crucial decisions on the farmer's part than conventional tillage does. Finally, agencies agree that no-till is an established practice that will survive in some form and that it is effective in reducing fuel costs.

Still, our research showed that agency staffs disagree as much as they agree about no-till's benefits. And these disagreements are crucial from the farmer's perspective. Agency staffs differ, for example, on whether farmers are able to maintain yields with no-till, on the risks involved, on overall production costs, on problems controlling weeds and grasses, and even on whether there are too many unknowns about no-till to recommend its widespread use (Table 1). These differences are crucial when it comes to recommending no-till as a practice, and these factors are shaping farmers' decisions about their use of no-till.

Considering the differences between no-till and conventional tillage, the absence of guidelines, the ambiguity of research, and the lack of agreement among respected sources of information, it isn't surprising that farmers express ambivalence. On-the-job learning, experimentation, and adaptation have not changed farmers' views of no-till so far.

Prepared by:

Andrew J. Sofranko
Professor of Rural Sociology

Sabina Alkire
Recent graduate in sociology

Issued by:

R. P. Kesler

Richard P. Kesler
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-5 *April 1990*

Illinois's Middle-Sized Farms Continue Rapid Decline in Numbers

The late 1970s and the 1980s presented an agricultural climate of paradox and contradiction. Times of prosperity and bountiful harvests contrasted starkly with several periods of drought and low prices for crops. Early in that time span, the financial climate changed from high inflation and "easy" credit to sharply reduced inflation and costly credit. The essential agricultural theme that developed through the mid-1980s was the "farm crisis," a sharp downturn in the economic viability of most farming operations. The economic situation facing agricultural practitioners led to predictions of far-ranging changes in the structure and operation of American farms. Not least among these changes was an anticipated major realignment in the numbers and sizes of farms.

Changes in the numbers and sizes of Illinois farms prior to and following the peak of the farm crisis are the focal point of this report, based on data from the 1978 and 1987 Censuses of Agriculture for Illinois. The period between the census dates establishing the limits of this study encompasses both the periods of prosperity and depression in the farm economy. Census of Agriculture data for 1982 will be used when it is needed to describe trends during the nine-year period.

As expected, Illinois farm numbers continued to decline from 1978 to 1987. In 1987, the Census of Agriculture reported a total of 88,786 farms in the state, down from a 1978 figure of 104,690. The overall decrease in farm numbers for the period 1978 to 1982 was 15.2 percent. The bulk of the decline in the number of farms occurred in the 1982 to 1987 period; the near 10 percent reduction in farm numbers between 1982 and 1987 was considerably higher than the 6.1 percent loss from 1978 to 1982.

Although farm numbers declined sharply, the amount of land in farms has remained rather stable over the period, resulting in continued increases in the average farm size. In 1978, approximately 29.5 million acres of land were in farms in Illinois with an average farm size of 282 acres. By 1987, the amount of land in farms in Illinois had been reduced to 28.5 million acres, a 3.4 percent reduction since 1978. Average farm size reached 321 acres.

The statewide pattern of changes realized from 1978 to 1987 differs little from earlier patterns. Figure 1 extends the information on farm numbers and acres in Illinois farms to 1959 and illustrates the relative stability of farm acreage. While the number of farms decreased by 43 percent (from 154,600 in 1959 to 88,786 in 1987), land in farms decreased by only 5.9 percent (from 30.3 million acres to 28.5 million acres). However, the decline in farm acreage between 1978 and 1982 was 3.2 percent, more than half the total decline for 1959 to 1987.

Farm structural characteristics tend to vary by location and predominant economic activity. To clarify variations in size, we subdivided Illinois farms into four classifications: less than 100 acres, 100 to 499 acres, 500 to 999 acres, and 1,000 acres and larger. To see if changes in size and numbers were evenly distributed across the farming community, or if particular segments were

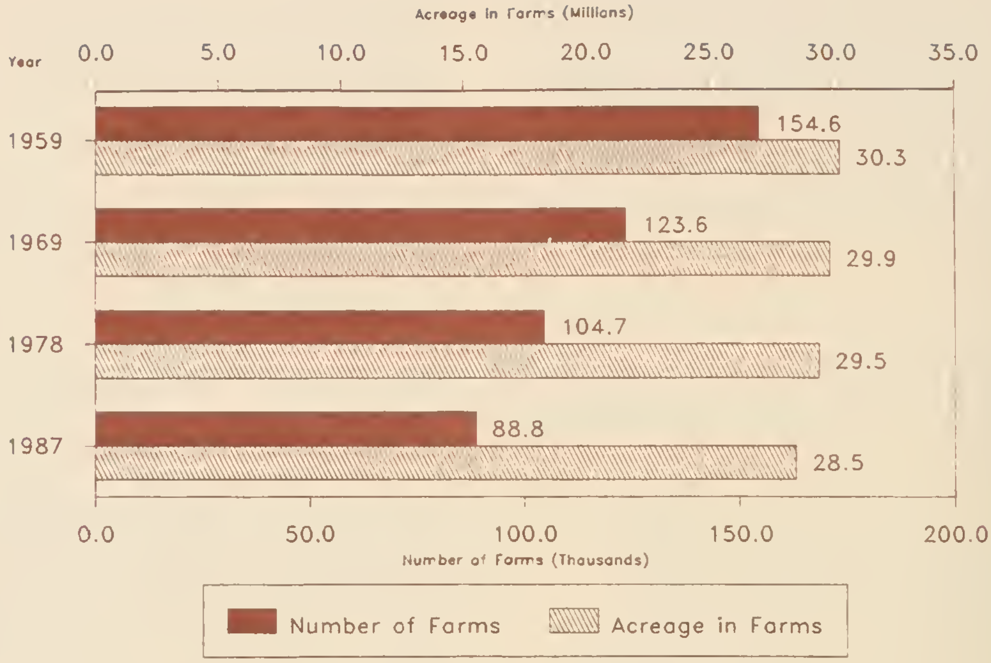


Figure 1. Trend in farm numbers and size, Illinois, 1959 to 1987.

more susceptible to change than others, we looked at the distribution of farm numbers and acreages in two broad categories: location with respect to metropolitan centers and agricultural dependency.

Distribution in Size Categories

Table 1 shows the distribution of farms within size categories for the years 1978 and 1987. Large farms clearly increased in numbers during this period while the number of smaller farms decreased. However, while there was an 8.8 percent loss of farms in the smallest category in this time period, there were 27.5 percent fewer farms between 100 and 499 acres than in 1978. In fact, all size categories except for the 100- to 499-acre group increased their percentage share of total farms between 1978 and 1987.

The distribution of acreages within size classes further illustrates the increasing strength of larger farms. Table 2 indicates that the amount of acreage in the largest size class increased by 57 percent from 1978 to 1987. Acreages less than 100 acres and from 100 to 499 acres both lost, in actual acreages *and* in their percentage of the total. Acreage from 100 to 499 acres decreased the most: 27.3 percent over the nine-year period. Farms in this range lost almost 9 percent of their share of the total acreage over the period.

Farms from 100 to 499 acres thus present a pattern of pronounced loss, quite different from the other size categories. This class lost over 15,000 farms during the period, and they failed to maintain their share of the total. The loss of acreage within this class was also more pronounced than in any other category.

Much has been made of the "disappearing" middle-sized farm. Data from the 1982 Census of Agriculture not reported here show a trend toward increased numbers of farms in the smallest and largest categories, with decreasing numbers in the middle-sized categories. Our data show a continuation of that trend. Although the smallest farms decreased in absolute numbers over the 1978 to 1987 period, their share of all farms still increased. The "middle," defined here as a class of farms ranging from 100 to 499 acres and containing the average farm size (321 acres), does appear to be shrinking as the number of farms in that category decreased dramatically over this period. Although this category remains numerically the largest of the four size classes, farms from 100 to 499 acres no longer represent the majority of farms in the state; these farms still represent

Table 1. Distribution of Farm Numbers Within Size Categories, Illinois, 1978 and 1987

Size category	Farm numbers 1978	Farm numbers 1987	Percent change
Less than 100 acres	32,417	29,558	-8.8
Percent of total	31.0	33.3	
100 to 499 acres	55,015	39,888	-27.5
Percent of total	52.6	44.9	
500 to 999 acres	14,019	14,320	2.1
Percent of total	13.4	16.1	
1,000 acres and over	3,239	5,020	55.0
Percent of total	3.0	5.6	
Totals	104,690	88,786	-15.2
	100.00	100.00	

Table 2. Distribution of Acreages Within Size Categories, Illinois, 1978 and 1987

Size category	Farm acreages 1978	Farm acreages 1987	Percent change
Less than 100 acres	1,398,771	1,151,748	-17.7
Percent of total	4.7	4.0	
100 to 499 acres	14,015,758	10,192,174	-27.3
Percent of total	47.6	35.7	
500 to 999 acres	9,362,687	9,818,956	4.9
Percent of total	31.8	34.5	
1,000 acres and over	4,690,257	7,362,256	57.0
Percent of total	15.9	25.8	
Totals	29,467,443	28,526,134	-3.2
	100.00	100.00	

numerically the largest class of farms, but their share in the percentage of all farms has dropped to near 45 percent.

Impact of Urban Centers

We have further grouped farms into classes based upon their proximity to urban centers. Using Metropolitan Statistical Area definitions and figures, we investigated size and number relationships in metropolitan counties, counties adjacent to metropolitan areas, and the more remote, nonadjacent counties.

We expected to find differing patterns of farm survival with proximity to metropolitan centers. Metropolitan centers offer a wide range of opportunities for off-farm employment and such employment opportunity can buffer the financial pressures of the farming operation. By providing additional income to meet daily living expenses, off-farm employment can increase the likelihood of the farm's survival. Also the urban marketplace is often more conducive to supporting diverse agricultural operations such as truck farms growing produce for the immediate urban market. The experiences in adjacent counties are thought to be transitional between changes in the urban counties and changes in the more remote counties.

Figures 2 and 3 show how metropolitan counties, counties adjacent to metropolitan areas, and nonadjacent counties performed in maintaining farm numbers and farm acreage over the period. As expected, metropolitan counties retained more small farms than counties adjacent to or removed from urban centers. Metropolitan counties lost only 3

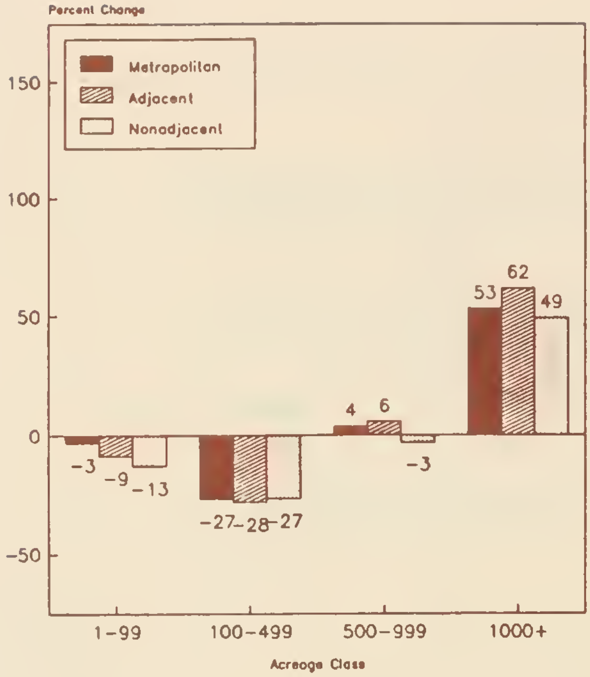


Figure 2. Percent change of farm numbers in farm size categories by location, Illinois, 1978 to 1987.

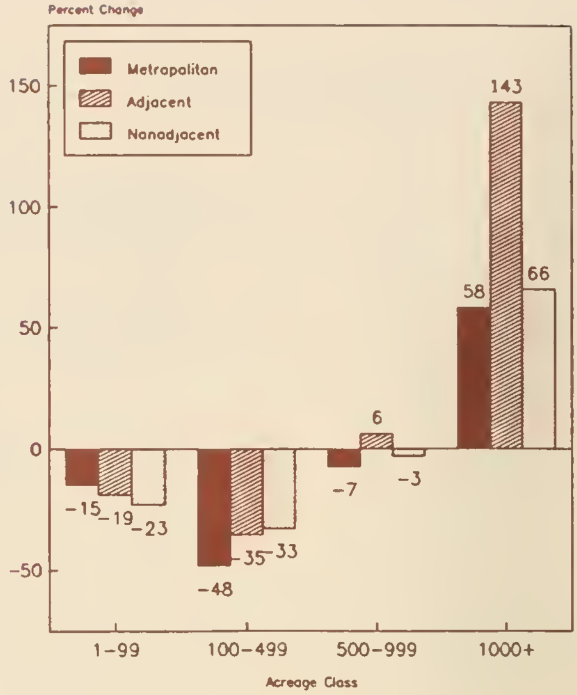


Figure 3. Percent change of acreage in farm size categories by location, Illinois, 1978 to 1987.

percent of their smaller farms while adjacent and nonadjacent counties lost 9 and 13 percent, respectively (Figure 2). The 3 percent loss of farms for metropolitan counties, however, translates into a 15 percent loss in acreage, compared to losses of 19 percent and 23 percent for adjacent and non-adjacent counties, respectively (Figure 3).

It appears that the majority of farms retained in metropolitan regions are the smallest in acreage, while surviving farms in adjacent and nonadjacent counties tend to be on the larger end of the small farms category. Proximity to metropolitan areas does appear to affect small farms, with increasing distance contributing to a decrease in the chances of a small farm's survival.

The importance of adjacency disappears as farm size increases. For example, for 100- to 499-acre farms, we see little difference among locational classifications, with all losing 27 to 28 percent of their farm base. When acreage change over the period is considered, however, the pattern reverses from the pattern for the smallest farms. For metropolitan areas, farms lost in the 100- to 499-acre classification tended to be larger than farms in the other locational classifications.

Farms of 500 to 999 acres exhibited the greatest stability between 1978 and 1987. Numbers of farms and the amount of acreage in farms varied little over this period, especially when compared to the other size classifications. Numbers of farms within the 500- to 999-acre category increased in both metropolitan and adjacent counties over the period. The amount of acreage in adjacent counties also increased within the size grouping. Metropolitan counties, while increasing the number of 500- to 999-acre farms, lost 7 percent of their acreage base within the category. In nonadjacent counties, both acreage and farm numbers for farms between 500 and 999 acres were reduced by approximately 3 percent.

The greatest change in farm numbers and acreage is apparent for farms 1,000 acres and over. Regardless of proximity to metropolitan centers, both numbers of farms and acreage within those farms increased substantially. The most notable change occurred within the adjacent counties.

These figures show the loss of middle-sized farms across the state. Regardless of location, the number of large farms has grown rapidly over the 1978 to 1987 period. This growth has been at the cost of small farms, primarily those in the 100- to 499-acre category, and the absorption of their acreage into a larger class. The 1- to 99-acre class lost farms in all locations, but that loss was far below the loss experienced in the 100- to 499-acre classification.

Impact of Agricultural Dependency

In Table 3, we have classified all *non-metropolitan* counties based upon their dependence upon agriculture for income. Agriculture-dependent counties are counties that rely upon farming for at least 20 percent of their gross income. All other non-metropolitan counties are classified as not dependent upon agriculture because sources other than agriculture contribute an equal or greater proportion of income.

The patterns here, to some degree, echo the patterns developed when counties were classified according to their proximity to metropolitan counties. However, some significant variations are apparent. Small farms (1 to 99 acres) were able to survive better in agriculture-dependent counties than in counties less reliant upon agriculture for income. However, in the 100- to 499-acre classification, the agriculture-dependent counties lost a higher percentage of farms than their counterparts did. As with proximity, little change is seen in the 500- to 999-acre category.

Farms 1,000 acres and larger increased within the category for both agriculture- and nonagriculture-dependent counties. Where agriculture is the dominant source of income, the growth in large farms was most rapid. There was a 62 percent increase in agriculture-dependent counties, compared to a 51 percent increase in nonagriculture-dependent counties (Table 3). Agriculture-dependent counties changed over the period in a manner closely reflecting the pattern found in counties adjacent to metropolitan areas. This pattern is more readily understood when the location of agriculture-dependent counties is considered; the majority of agriculture-dependent counties can be found adjacent to metropolitan areas.

While the differences shown in Table 3 are subtle, the agriculture-dependent counties show the disappearing middle more specifically than the nonagriculture-dependent counties. While change in the 100- to 499-acre category is essentially the same, the rate of change for smaller and larger farms differs between the classifications. Agriculture-dependent counties lost less farms at the lower end and gained more farms at the upper end of the size categories than non-agriculture-dependent counties.

Summary

Comparing data from the Censuses of Agriculture for 1978 and 1987 indicates that:

- Illinois lost 15 percent of all farms during that time period. While the farm crisis

Table 3. Distribution of Farm Numbers by Agriculture Dependency, Illinois, 1978 and 1987

	Agriculture-dependent			Nonagriculture-dependent		
Size category	1978	1987	Percent change	1978	1987	Percent change
Less than 100 acres	7,434	6,974	-6.2	16,027	13,910	-13.2
Percent of total	26.1	28.7		32.2	33.5	
100 to 499 acres	15,487	11,069	-28.5	26,037	18,977	-27.1
Percent of total	54.3	45.4		52.3	45.7	
500 to 999 acres	4,597	4,698	2.2	6,209	6,291	1.3
Percent of total	16.1	19.3		12.5	15.2	
1,000 acres and over	990	1,601	62.2	1,513	2,292	51.5
Percent of total	3.5	6.6		3.0	5.5	
Totals	28,508	24,342	-14.6	49,786	41,470	-16.1
	100.00	100.00		100.00	100.00	

may have had significant impact on individual farmers, it did not substantially alter the historical patterns of change in farm size and numbers.

- Middle-sized farms (100 to 499 acres) are losing numbers most rapidly; farms more than 1,000 acres are gaining numbers most rapidly.

- Proximity to urban centers does not appear to affect change in farm size categories, except that the smallest farms maintain their numbers best in metropolitan counties.

- The further disappearance of middle-sized farms is more pronounced in agriculture-dependent counties than in nonagriculture-dependent counties.

- When areas of the state lose farms, they not only lose a business enterprise; they are also liable to lose people. Thus, community and economic development in rural Illinois aimed at providing a more diversified local economy cannot be overemphasized. Unless farm operators—and those leaving farming—are given viable opportunities to remain in their communities, the declining numbers in agriculture will continue to be associated with decline in rural communities.

Prepared by:

Gary W. Morgan
Research Assistant
Cooperative Extension Service

John C. van Es
Professor of Rural Sociology

Issued by:

R. P. Kesler

Richard P. Kesler
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-6 *May 1990*

Cost of Growing Corn and Soybeans in 1989

In 1989, the total of all costs per acre for growing corn in Illinois averaged $336 in the northern section, $339 in the central section with the higher soil ratings, $308 in the central section with the lower soil ratings, and $277 in the southern section. The soybean costs per acre were $270, $273, $244, and $219, respectively (see Table 1). Costs were lower in the southern section, primarily because land costs are lower there. The total of all costs per bushel in the different sections of the state ranged from $2.18 to $2.34 for corn and from $5.30 to $5.74 for soybeans. Variations in this cost were related to weather factors, yields, and land quality. For the most part, variations in the cost per bushel of raising corn and soybeans in 1989 were limited due to consistent yields across most areas of the state.

These figures were obtained from farm business records kept by farmers enrolled in the Illinois Farm Business Farm Management Association. The samples included only farms with more than 260 acres of productive and nearly level soils in each area of the state; these are farms without livestock. Farms located in 22 counties north and northwest of the Illinois River are included in the sample for northern Illinois. Farms from 36 counties below a line from about Mattoon to Alton are in the sample for southern Illinois. The remaining 44 counties make up the sample for central Illinois. The sample farms averaged 677 tillable acres in northern Illinois, 712 acres in the central section with high soil ratings, 774 acres in the central section with lower soil ratings, and 890 acres in southern Illinois.

This analysis includes some factors in the cost of doing business that nonagricultural businesses may not include. These factors are not used as expense items on income tax returns. Examples include the charge for labor performed by the farm operator, a rental charge for the use of owned and rented land, and an interest charge on equity in machinery and inventories of grain and livestock. In the short run, farm operators may continue to produce without covering these total costs of production. However, if returns do not equal the total cost of production in the long run, it will be difficult to maintain resources in the farm firm.

Nonland Costs

Soil fertility costs for soybeans were allocated on the basis of phosphorus, potassium, and lime removal, with the residual cost allocated to corn. The seed, crop, chemical, and drying expenses also included some commercial drying and storage and the estimated value of home-raised seed. The costs of fuel, machine hire, and machinery repair were reduced for income received from custom work. Labor costs included the cash value of hired labor, plus a charge for available unpaid labor at a rate of $1,250 per month. Building and storage costs were for repairs and depreciation only. The nonland interest rate in 1989 was set at 11 percent; this figure was then multiplied by the sum of half the average inventory value of crops at the beginning and the end of the year, the depreciated value of machinery and buildings, and half the total operating expenses. The result is the total nonland interest charge. Overhead costs included insurance, utilities, the farm share of

Table 1. Cost per Acre of Growing Corn and Soybeans on Illinois Grain Farms Without Livestock in 1989

	Corn				Soybeans			
	North	Central[1]	Central[2]	South	North	Central[1]	Central[2]	South
Number of farms	341	627	337	246	341	627	337	246
Acres in crop	354	338	359	337	260	323	334	339
Nonland Costs								
Variable costs:								
Soil fertility	$ 53	$ 52	$ 51	$ 53	$ 17	$ 17	$ 17	$ 18
Pesticides	20	21	19	20	24	21	20	21
Seed	25	24	25	22	12	14	13	14
Drying and storage	7	7	5	4	2	3	3	2
Repairs, fuel, and hire.	30	27	26	33	24	23	23	29
Total, variable costs	$ 135	$ 131	$ 126	$ 132	$ 79	$ 78	$ 76	$ 84
Percent change from 1988	0	0	-1	7	0	-4	-4	9
Other nonland costs:								
Labor	$ 26	$ 28	$ 27	$ 29	$ 25	$ 25	$ 24	$ 27
Buildings and storage	10	7	7	7	7	4	3	4
Machinery depreciation	18	19	17	21	15	15	13	17
Nonland interest	29	26	22	16	26	23	19	15
Overhead	14	13	13	10	14	13	13	10
Total, other costs	$ 97	$ 93	$ 86	$ 83	$ 87	$ 80	$ 72	$ 73
Total, nonland costs	$ 232	$ 224	212	$ 215	$ 166	$ 158	$ 148	$ 157
Percent change from 1988	0	0	-2	6	-1	-2	-3	8
Land costs								
Taxes	$ 19	$ 21	$ 17	$ 9	$ 19	$ 21	$ 17	$ 9
Annually adjusted net rent	85	94	79	53	85	94	79	53
Total land cost	$ 104	$ 115	$ 96	$ 62	$ 104	$ 115	$ 96	$ 62
Total, all costs	$ 336	$ 339	$ 308	$ 277	$ 270	$ 273	$ 244	$ 219
Percent change from 1988	-1	-1	-2	5	-1	-2	-3	5
1989 yields, bushels per acre	145	145	135	127	47	49	46	40
Nonland cost per bushel	$1.60	$1.54	$1.57	$1.69	$3.53	$3.22	$ 3.22	$3.93
Total, all costs per bushel	$2.32	$2.34	$2.28	$2.18	$5.74	$5.57	$5.30	$5.48
1986-1989 average yield	125	137	118	122	42	44	38	36
Nonland cost per bushel	$1.86	$1.64	$1.80	$1.76	$3.95	$3.59	$ 3.89	$4.36
Total, all costs per bushel	$2.69	$2.37	$2.61	$2.27	$6.43	$6.20	$6.42	$6.08

Note: The entries shown below the "dash" line are costs based on 1986-1989 average yields.
[1]Soil productivity ratings of 86 to 100.
[2]Soil productivity ratings of 56 to 85.

light vehicle expenses, and miscellaneous items. No charge has been made in this analysis for management, but it would normally be about 5 percent of the total cost per bushel, or 10 to 15 cents for corn and 25 to 30 cents per bushel for soybeans.

Land Costs

Land costs included the adjusted net rent and the real estate taxes. Net rent was represented as the average rent received by crop-share landlords on record-keeping farms for the period 1985 to 1988. Caution is needed in interpreting differences in land costs between areas. In the long run, the net rent residual return to landowners should tend to equalize the total cost of production.

Cost per Bushel

Production costs per bushel of corn decreased significantly in 1989 compared to 1988 due to a dramatic increase in yields in 1989. Yields in 1988 were reduced significantly due to the drought that occurred during 1988. The decrease in costs per bushel ranged from $0.72 in southern Illinois to $2.95 on central Illinois farms with the lower soil ratings. The increase in average corn yields ranged from 36 bushels per acre in southern Illinois to 75 bushels per acre on central Illinois farms with the lower soil ratings. The average corn yield for all four areas of the state was above the four-year average from 1986 to 1989, ranging from 20 bushels per acre higher in northern Illinois to 5 bushels per acre higher in southern Illinois. While yields increased dramatically, total costs per acre changed very little in 1989 compared to 1988. Total costs per acre to produce corn in northern Illinois and on the central Illinois farms with the higher soil ratings decreased 1 percent while total costs in southern Illinois increased 5 percent. Total costs per acre on the central Illinois farms with the lower soil ratings decreased 2 percent.

Production costs per bushel of soybeans also decreased dramatically in 1989 compared to 1988 as a result of improved yields. The decrease in costs per bushel ranged from $1.73 in southern Illinois to $5.61 on the central Illinois farms with the lower soil ratings. Average soybean yields increased in a range of 11 bushels per acre on southern Illinois farms to 23 bushels per acre on the central Illinois farms with the lower soil ratings. Total costs per acre decreased 1 to 3 percent in northern and central Illinois and increased 8 percent in southern Illinois. Average soybean yields in the different areas of the state were 4 to 8 bushels per acre higher than the four-year average from 1986 to 1989.

The total of all costs per acre to produce corn has decreased 17 percent, from $390 per acre in 1981 to $322 per acre in 1989 (see Figure 1). Out-of-pocket cash costs such as fertilizer, chemicals, and seed have declined only $10 per acre during this period. Other nonland costs, such as machinery depreciation and interest charges, have decreased by $45 per acre because of fewer purchases of machinery and equipment. This cutback in purchases, along with an increase in the average farm size in this sample, has lowered the per-acre nonland interest charge on capital invested in the business. In addition, total land costs have decreased 12 percent since 1981 due to lower land values. Total cost per acre to produce soybeans has declined 15 percent, from $308 per acre in 1981 to $257 per acre in 1988 (see Figure 2). All of the decrease has come from the other nonland and land costs. Variable costs have actually increased slightly since 1981. The factors that reduced the total cost per acre to produce corn were also the reasons that total cost per acre to raise soybeans declined.

Current selling prices for corn are near or above the average total 1989 cost of production when using the average yield for the past four years, while current selling prices for soybeans are below the average total 1989 cost of production when using the average yield for the past four years. An owner-operator with average yields during the past four years (1986 to 1989) would need $0.96 to $1.08 per bushel for corn and $1.77 to $2.83 per bushel for soybeans to recover the variable costs listed in Table 1. Recovering the total of all costs would require receiving $2.27 to $2.69 a bushel for corn and $6.08 to $6.43 a bushel for soybeans. Individual tenants and landowners computing the average break-even cost per bushel for growing corn and soybeans should divide the costs and yields shown in the table as they are shared by the terms of the lease.

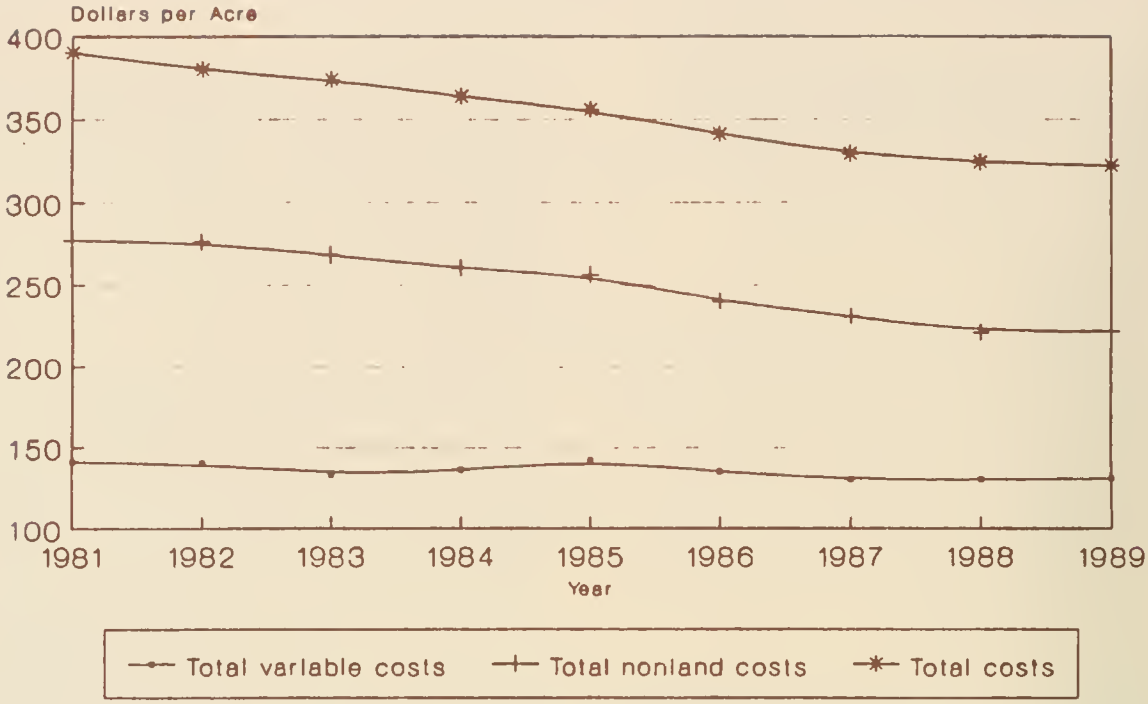


Figure 1. Total cost per acre to grow corn on Illinois grain farms, 1981 to 1989.

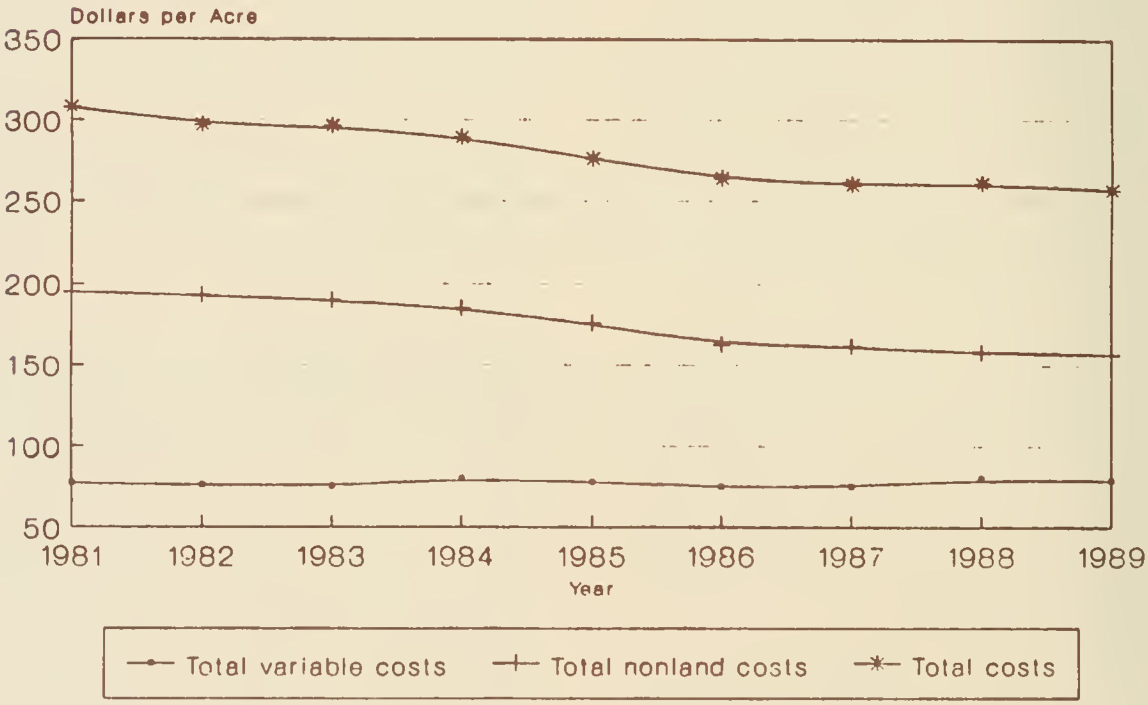


Figure 2. Total cost per acre to grow soybeans on Illinois grain farms, 1981 to 1989.

Farmland values are related to grain prices and the nonland costs of production because income left after other costs have been deducted is considered the return to land. Values for Illinois farmland increased by about 17 percent the past two years after having declined by almost 50 percent since 1979. This turnaround was due to improved farm earnings and a return to farmland that was more competitive with alternative nonfarm investments. Farm earnings for 1989 will be higher in most areas of the state when compared to 1988. The financial side of the agricultural sector has stabilized and is starting to show some improvements. In addition to improved farm earnings and increasing land values, farm operators have also increased their expenditures for machinery and equipment. However, farm operators will need to monitor their financial condition closely and avoid an excessive level of borrowed capital to finance their business. Future farm earnings will depend more on factors that occur in our global economy as we can expect less income support from government farm programs. To remain competitive in the future, farm operators will need to place a high priority on the marketing function of their farming operation while continuing to control costs.

Prepared by:

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-7 *June 1990*

The Financial Position of Illinois Farm Operators: Costs and Returns from Crop and Livestock Enterprises

Farm Earnings Rebound in 1989

This report, based on summaries of records kept for the Illinois Farm Business Farm Management Association (FBFM), reviews the financial status of Illinois farm operators over the past four years. Farm operator earnings increased significantly in 1989 compared to the drought-reduced returns of 1988. Good crop yields and stable input costs were the main factors contributing to the improved earnings. Returns to most livestock enterprises were similar to the year before, although returns to dairy producers improved due to an increase in milk prices. Continued emphasis on controlling costs as well as monitoring the financial progress of the business will be important as future earnings will depend more on global market factors and less on government farm programs.

Records kept by 3,945 farmers enrolled in the Illinois FBFM record-keeping program have been used to estimate changes in net worth from 1986 to 1989. On a cost basis, without considering inflation or deflation of capital asset values, the change was calculated by adding net farm and net nonfarm income and subtracting farm living expenses and income and Social Security taxes (Table 1). Using this method, the net worth of the average Illinois farm operator increased by $848 in 1986, by $15,372 in 1987, by $166 in 1988, and by $17,884 in 1989.

The change in net worth on a balance sheet based on fair market value would be affected negatively if it included the change in land values from 1986 and 1987. Land values increased during 1988 and 1989, which would positively affect the change in net worth. Net worth changes would vary greatly among farms and areas in the state.

Net farm income is the accrued value of the operator's share of farm production less total operating expenses, including the amount of interest paid and depreciation, plus gain or loss on machinery or buildings sold. When added to net nonfarm income, this is the income available to pay for family living expenses and income and Social Security taxes. This is also the source of income used to pay the principal on long-term debt and to invest in savings. Estimates used in Table 1 for net nonfarm income and withdrawals for living expenses and taxes were based on a sample of 355 Illinois farm families. Most of these farms were located in central Illinois. These families identified all sources of farm and nonfarm funds and the uses of these funds for precise expenditures. These expenditures were then adjusted downward by 10 percent to reflect the larger-than-average farms in central Illinois.

Capacity for Repaying Capital Debt

The average amount available to each farm operator for repayment of capital debt was estimated at $22,149 in 1986, $35,120 in 1987, $17,236 in 1988, and $33,406 in 1989 (Table 1). These funds were estimated to be

Table 1. Estimated Change in Net Worth and Capacity for Repayment of Capital Debt for 3,945 Illinois Farm Operators

	All Illinois counties			
	1986	1987	1988	1989
Net farm income	$21,575	$39,753	$24,503	$44,156
+ net nonfarm income[a]	8,526	8,682	9,654	10,502
- family living expenses[b]	25,868	26,505	26,858	29,538
- income and Social Security taxes[b]	3,385	6,558	7,133	7,236
Change in net worth	$ 848	$15,372	$ 166	$17,884
+ depreciation	21,301	19,748	17,070	15,522
Funds available for capital debt repayment	$22,149	$35,120	$17,236	$33,406
Capital purchases	$14,674	$14,637	$15,292	$18,440
Cash interest paid	$17,107	$14,371	$13,611	$14,775

[a]Actual amounts identified from a sample of 355 farms for 1986, 1987, 1988, and 1989.
[b]Actual amounts identified from a sample of 355 farms for 1986, 1987, 1988, and 1989, reduced by 10 percent.

available for capital purchases and payment of principal on long-term debt. The table shows actual dollar commitments per farm that were made for capital purchases of machinery, equipment, or buildings. Results from the last four years indicate that the amount spent for capital purchases has been less than the amount available for capital debt repayment. Capital purchases in 1989 were at their highest level since 1982, reflecting improved earnings and limited capital purchases by farm operators during the past few years. Funds available for repayment of capital debt were highest in 1987.

The records show that funds available for debt repayment were fairly consistent across most areas of the state in 1989. Estimated changes in net worth in 1989 were positive for all areas of the state. Estimated changes in net worth ranged from a $26,000 increase in northeastern Illinois to a $5,000 increase in western Illinois. Earnings were not as high in western Illinois compared to other areas of the state because lack of rainfall reduced grain yields.

Interest Paid as a Percentage of Gross Farm Returns

The amount of interest paid by an FBFM operator averaged 9.8 percent of gross farm returns in 1988 compared to 9.2 percent in 1987, 12.2 percent in 1986, and 13.1 percent in 1985. The average cash interest paid in 1988 was $13,611. This amount was $760 lower than in 1987 and $3,496 lower than in 1986. The average cash interest paid in 1989 was $14,775, $1,164 higher than in 1988. This year was the first since 1985 that the amount of interest paid exceeded the amount paid in the prior year. The average interest paid as a percentage of gross farm returns, however, will be slightly lower in 1989 compared to 1988 due to higher gross returns. Approximately 8 percent of the farm operators had negative incomes in 1988 compared to only 2 percent in 1987. These 8 percent were paying over 25 percent of their gross farm returns for interest. Sixty-two percent of farm operators in 1988 paid less than 10 percent of their gross farm returns for interest. The average income for farmers in this group was $7,609 higher than the average income for all the farm operators. The 1989 incomes for farm operators were the highest of any year of the 1980s. The percentage of farms having negative farm incomes in 1989 will be less than in 1988 due to improved farm earnings.

Costs and Returns from Crops

Corn and soybean crops make important contributions to net farm incomes and the financial status of farm operators. Figures 1 and 2 show the cost and return per bushel of both corn and soybeans produced each year from 1979 to 1989 on 500 central Illinois grain farms with high-quality soils and no livestock. Note that the total cost of growing a bushel of corn has exceeded the average annual Illinois corn price in five of the ten years since 1980. The difference between the total of all costs and the total nonland cost line is the charge for the use of land. The deficits indicate that profits (returns for risk and management) had to come from equities in capital, primarily land, or other unpaid inputs, such as operator labor or debtfree facilities. Income support provided by the government farm program has offset part of the deficits.

Variable cost reflects the total of cash expenditures for fertilizer, pesticides, seed, and drying, which are normally shared according to the terms of the lease on rented farms, plus the cost of fuel, and machinery hire and repair. Other nonland costs include labor, depreciation, interest, building upkeep, and overhead.

Total costs per acre of corn produced in 1989 decreased 1 percent from 1988. However, significantly higher yields on these sample farms resulted in a substantially lower cost of production in 1989 than in 1988. Using the past four-year average corn yield of 137 bushels per acre, costs per bushel of corn produced are now averaging about $0.96 for the variable cost, $1.64 for the total nonland cost, and $2.47 for the total cost.

Figure 2 shows the cost and return per bushel of soybeans produced on these same farms from 1979 to 1989. The total cost has exceeded returns each year since 1980 with the exception of 1985 and 1989. Improved yields significantly reduced the cost per bushel to produce soybeans in 1989. With a normal yield of 44 bushels per acre, costs per bushel are now averaging about $1.77 for the variable cost, $3.59 for the total nonland cost, and $6.20 for the total cost.

Costs and Returns from Livestock

The value of livestock has also been important to the current financial status of farm operators. The cost and return per hundredweight

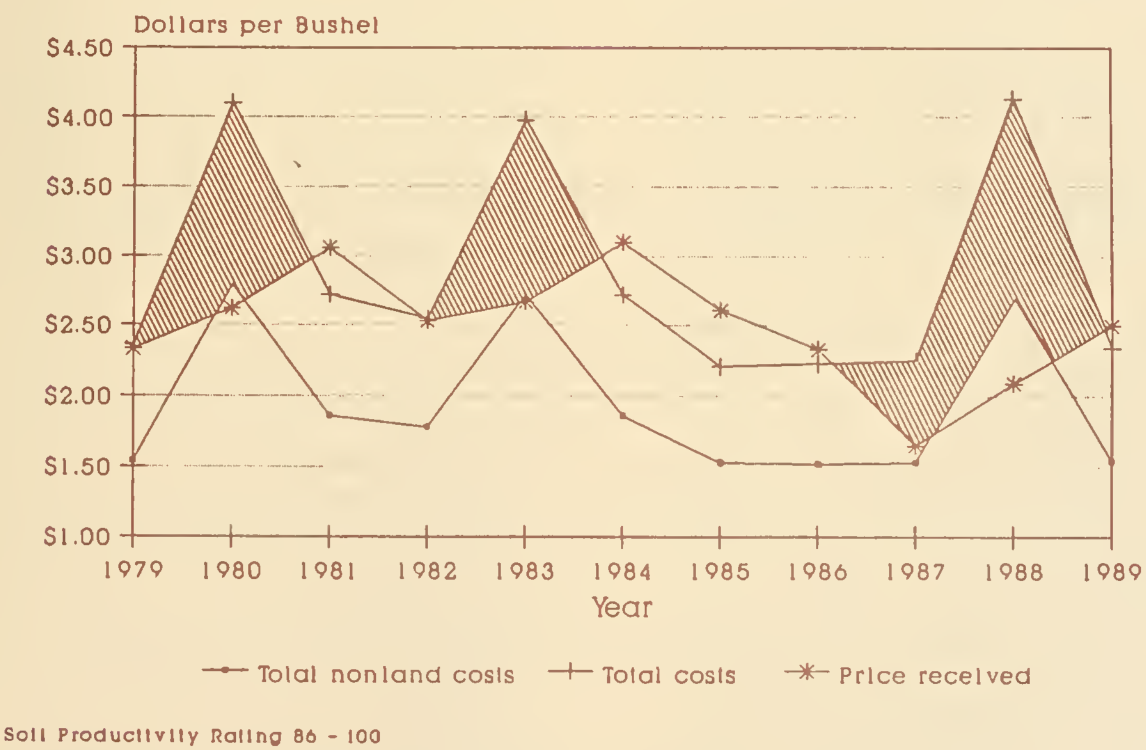


Figure 1. Cost and return per bushel of corn on central Illinois grain farms, 1979 to 1989.

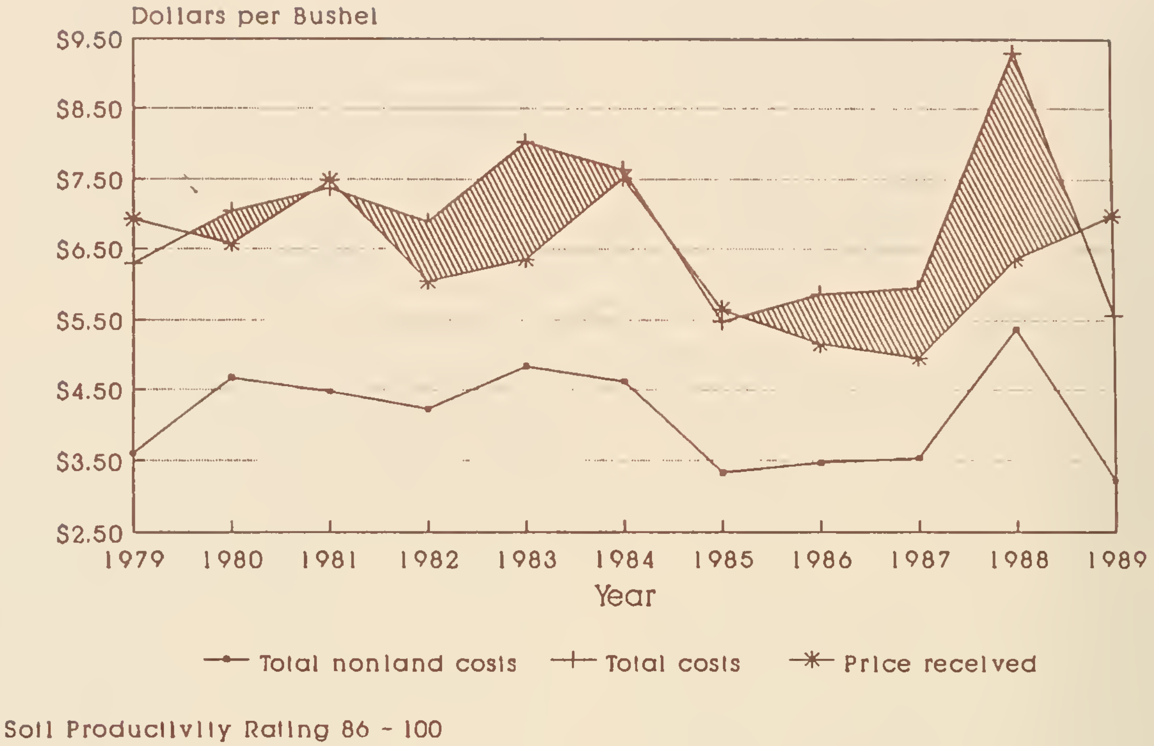


Figure 2. Cost and return per bushel of soybeans on central Illinois grain farms, 1979 to 1989.

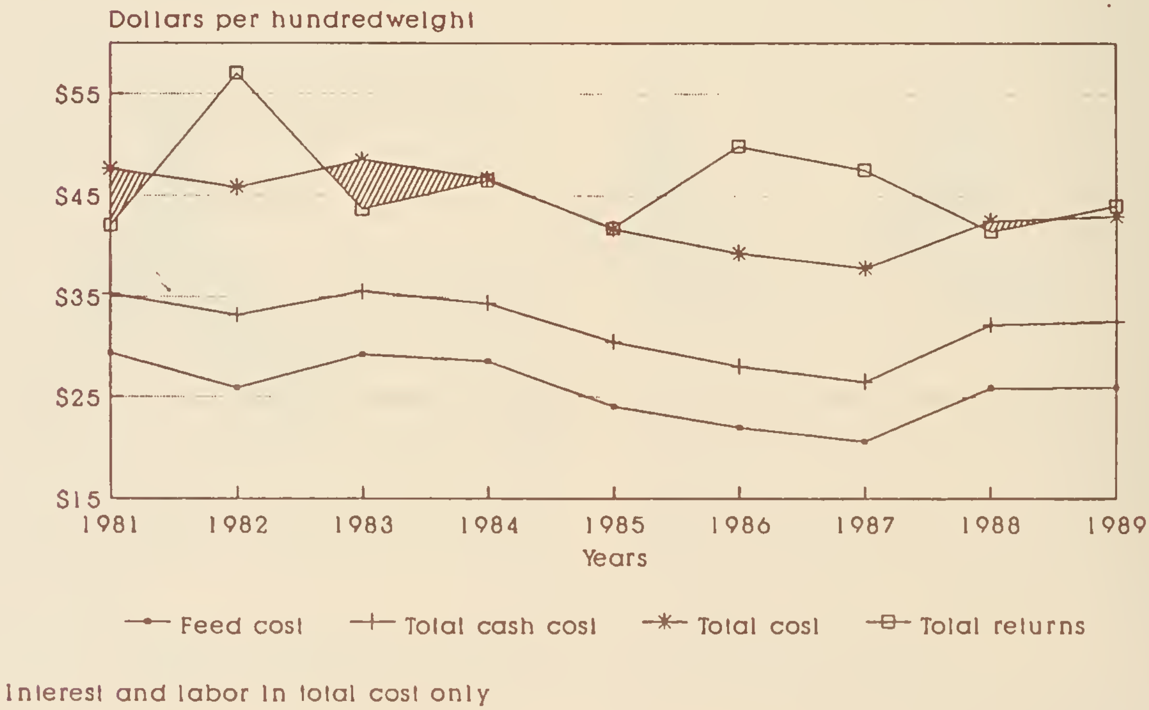


Figure 3. Cost and returns per one hundred pounds of pork on farms with over 250 litters, 1981 to 1989.

Table 2. Returns above Cost of Feed and Purchased Animals to Livestock Enterprise Units from 1985 to 1989

Year	Farrow-to-finish hogs	Feeder pig finishing	Feeder cattle	Dairy cattle	Beef herd[a]
	-------per hundredweight-------			-----per cow-----	
1985	$16.71	$ 7.00	$ 8.86	$1,054	$ 5
1986	26.50	16.06	17.93	1,062	85
1987	25.09	13.28	30.47	1,301	212
1988	14.01	6.63	20.56	1,116	196
1989	16.71	10.20	18.66	1,334	170
5-year average	$19.80	$10.63	$19.30	$1,173	$134
Nonfeed costs, 1985-1989					
Direct cash	$ 6.20[c]	$ 4.10[b]	$12.40[c]	$ 390[c]	$ 30[b]
Other costs	11.00[c]	6.65[b]	12.50[c]	685[c]	175[b]
Total	$17.20	$10.75	$24.90	$1,075	$205

[a]The feed cost for beef herds includes up to $60 of hay equivalent from salvage roughage.
[b]Includes veterinary costs, utilities, fuel, equipment and building repair costs, depreciation, labor, and other nonfeed costs, including interest on feeder livestock, from Table 6, *Farm Management Manuals,* 1985 to 1989.
[c]Estimates of annual nonfeed costs are based on enterprise cost studies of operative units from 1985 to 1988.

of pork produced annually from 1981 to 1989 on a sample of 90 farrow-to-finish enterprises with an average of 435 litters per year are shown in Figure 3. Returns to farrow-to-finish hog producers were slightly better in 1989 compared to 1988, but below the average returns for the past five years. Market hog prices averaged about $1 per hundredweight more in 1989 than in 1988. Feed costs remained basically the same as improved feed efficiencies offset higher corn prices.

Table 2 shows the average returns above the cost of feed and purchased animals from the annual records of about 1,500 individual livestock enterprises from 1985 to 1989. This is the return available to pay for labor, machinery, equipment and building repairs, depreciation, livestock expense, taxes, overhead, and an interest charge on all capital used. There is no economic profit until these costs are covered. The last five-year average returns from the farrow-to-finish hog and dairy enterprise covered total costs. Based on the estimates of nonfeed costs in Table 2, the average returns above all costs from 1985 to 1989 for farrow-to-finish hogs were $19.80 (returns above feed and purchased animals) minus $17.20 (nonfeed costs), or a positive $2.60 per hundred pounds produced. For feeder pig finishing enterprises, total costs per hundredweight exceeded returns by an average of $0.12. Feeder cattle showed returns per hundredweight that were $5.60 short of covering all costs; dairy returns averaged $98 per cow above all costs, whereas beef cow herds were $71 short per cow.

Returns to livestock in 1989 were similar to 1988 returns. Feed costs increased slightly for most enterprises. Prices received for pork remained about the same while milk prices increased 10 percent. Fat cattle prices were higher but the cost of replacement feeders also increased. For the second year in a row, dairying was the only livestock enterprise in which management returns were positive. Livestock producers who use their own capital without borrowed funds have large amounts of nonsaleable labor, feed, or buildings; and producers who are more efficient than the average farmer have been in the best position to withstand the narrower profit margins.

Prepared by:

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-8 *June 1990*

Illinois Farm Income: A Review of the 1980s

The decade of the 1980s will be remembered as a time of financial stress and hardship for many farmers, but a time of opportunity for others. While farm operators are striving to fine-tune their production practices, the economic climate is forcing them to focus on the financial aspects of their farm businesses. Following the decade of the 1970s, when farm operators increased their incomes through expanding exports for agricultural products and experienced a rapid increase in input costs and a reduction in government farm programs, the decade of the 1980s brought reduced exports, grain surpluses, lower farm incomes, and an increase in government involvement in agriculture. The decade also brought higher interest rates and deflating land values. In addition, many Illinois farm operators experienced drought in 1980, 1983, and 1988. Finally, as the decade comes to a close, farmers are confronting new concerns and challenges. Farmers are concerned about fertilizers and pesticides applied to the land and how these inputs affect the environment. In the decade to come, farmers will be working to protect the air, water, and soil while remaining competitive in the world marketplace.

Summaries of Illinois Farm Business Farm Management Association (FBFM) records provide complete and accurate income data for Illinois farm operators for the 1980s. The Illinois FBFM Association, in cooperation with the Department of Agricultural Economics at the University of Illinois, provides business analysis and record-keeping services for Illinois farmers. A comparison of Illinois FBFM farm operators with 1987 agriculture census data indicates that one of every four Illinois farmers with total farm sales exceeding $100,000 is enrolled in FBFM. In 1989, the sample of farms included 3,945 farms averaging 639 tillable acres in size.

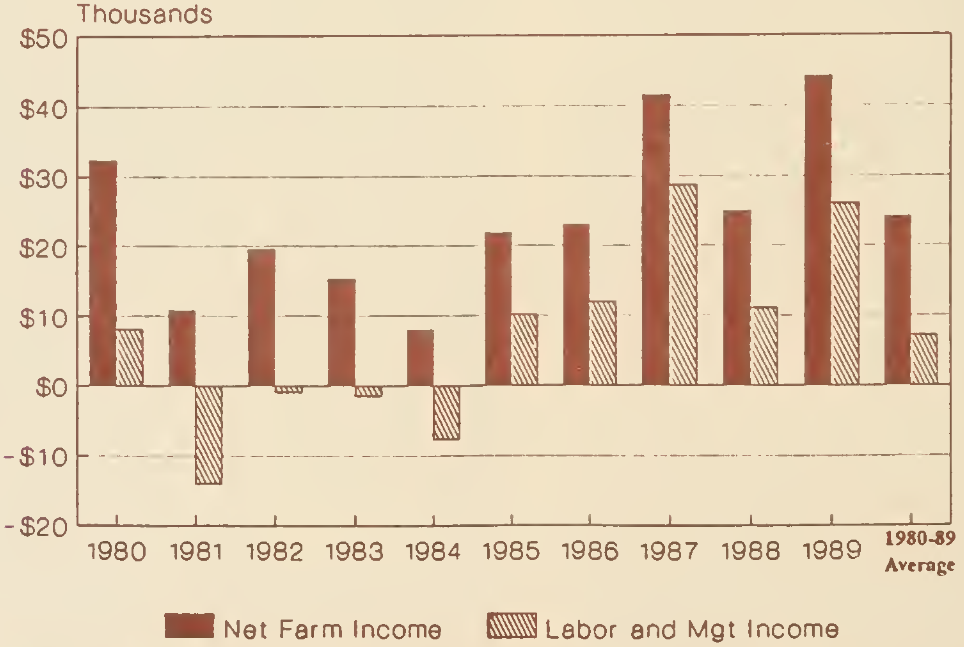
Farm Operator's Net Farm Income and Return to Labor and Management

Figure 1 shows the average net farm income per farm and return to labor and management for farm operators during the 1980s. The data are presented in Table 1. The return to labor and management can be thought of as the farmer's wage or salary. Net farm income includes the return to labor and management (salary) plus the farm operator's return on equity capital. Thus, the farmer's "salary" is net farm income after subtracting a fair return to the farm operator's equity in the farm business. Production agriculture is a capital intensive business. A large portion of net farm income in any year is a return to equity capital. Without a competitive return to capital, additional investment will be limited. When farm income is low, either labor or capital will not receive a competitive return. In Figure 1, equity capital was rewarded first, with labor and management receiving the residual. For example, in 1989, average net farm income was $44,156 per farmer, average return on equity capital was $18,141, and the average farmer "salary" was $26,015.

The average annual residual return to labor and management from 1980 to 1989 was $7,223. Returns to labor and management

Table 1. Farm Operator's Net Farm Income, Return to Labor and Management, and Family Living Expense, 1980 to 1989

Year	Net Farm Income	Return to Labor and Management	Family Living Expense	Three Year Moving Average: Net Farm Income	Three Year Moving Average: Return to Labor and Management
1980	$32,379	$8,138	$26,606	$37,841	$16,134
1981	10,879	-14,017	28,727	28,234	4,611
1982	19,546	-887	26,502	20,925	-2,255
1983	15,261	-1,443	27,674	15,229	-5,449
1984	7,974	-7,634	28,383	14,260	-3,321
1985	21,870	10,248	28,425	15,035	390
1986	23,046	12,036	29,253	17,630	4,883
1987	41,546	28,669	33,063	28,821	16,984
1988	24,917	11,100	33,991	29,836	17,268
1989	44,156	26,015	36,773	36,873	21,928
1980-1989 Average	$24,157	$7,223	$29,940	--	--



Source: Illinois Farm Business Farm Management Association Records, Cooperative Extension Service and Department of Agricultural Economics, College of Agriculture, University of Illinois at Urbana-Champaign.

Figure 1. Farm operator's net farm income and return to labor and management, 1980 to 1989.

varied from $21,446 above the average to $21,240 below the average. Return to labor and management was highest in 1987, at $28,669. In only two years did the return to labor and management average over $20,000. For four years during the decade (1981 to 1984), there was a negative return to labor and management. In these years, equity capital was not rewarded fully and labor and management were not rewarded at all. These low returns caused significant disinvestment in agriculture. Capital flowed out of the industry to higher yielding uses in other sectors. The disinvestment was brought about by lower farmland values and reduced expenditures for machinery and equipment.

Figure 1 also shows the average operator's share of net farm income from 1980 to 1989. Operator's net farm income for this sample of farms averaged $24,157 for the decade. The average operator's net farm income was lowest in 1984 ($7,634), when it was 132 percent below the average, and was highest in 1989 ($44,156) when it was 83 percent above the average. Net farm income was lowest from 1981 to 1986, while two of the three highest incomes for the decade were in 1987 and 1989. Incomes improved toward the end of the decade, as farm operators reduced debt where possible and reduced capital expenditures for machinery and equipment. A reduction in grain surpluses in the last years of the decade improved product prices, which enhanced farm incomes. Also, the average size of farms in this sample increased by more than 100 acres during the decade, which used existing labor and machinery more efficiently.

Figure 1 clearly shows that net farm income fluctuates greatly from year to year. The fluctuation is caused by fluctuations in input prices, crop yields, and crop prices. One way of providing a clearer picture of longer-term farm income trends is to average the annual data over three-year periods. Figure 2 presents three-year moving averages for operator's net farm income and returns to operator's labor and management for Illinois. The decline in farm income during the middle of the decade is vividly portrayed. Incomes have recovered in recent years. The income data has not been adjusted for inflation.

Farm Operator's Labor and Management Returns Compared to the Income Needed for Family Living Expenses

What level of income would be a fair return for the operator's labor and management? "Fair" depends on the skill and management capabilities of each operator. However, a starting point might be a return sufficient to cover the operator's family living expenses, including income and Social Security taxes. Data on family living expenditures are available from FBFM farm operator records. These families account for all funds that flow through their businesses, both farm and nonfarm. Figure 3 compares family living expenses, including income and Social Security taxes, with returns to operator's labor and management for the 1980s. As illustrated, family living expenses and tax payments exceed the return to operator labor and management every year during the decade. To meet total family living expenses, farm operators were using returns to equity capital, supplementing farm income with nonfarm income or using up equity in the business. For this to continue in the 1990s, Illinois farm operators must be willing to continue to discount the return to their labor or the return to their equity capital, or to supplement farm income with nonfarm income.

Summary

Illinois farm operator labor and management returns during the 1980s were variable, with an average of $7,223. The return to labor and management, or the salary of the average farmer, was less than $10,000 in six of the ten years, and returns were negative more than one-third of the time. Because a large percentage of Illinois grain production is exported, future earnings for Illinois farmers will depend to a great extent on global economic and political forces. Building and developing new markets for Illinois products will become increasingly important. Biotechnological breakthroughs that reduce production costs and improve competitiveness will also be important. In addition, the economic forces working within this country that affect such things as interest and

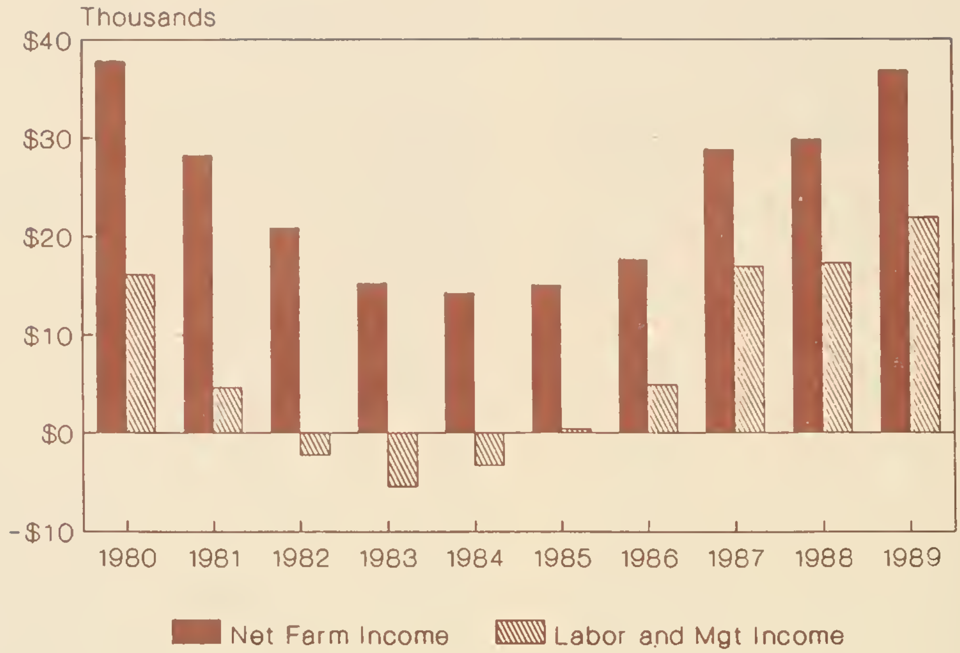


Figure 2. Three-year moving average for farm operator's net farm income and return to labor and management, 1980 to 1989.

Figure 3. Farm operator's return to labor and management and family living expenses, 1980 to 1989.

inflation rates will also have a bearing on farm earnings.

If the modest returns to agriculture continue into the 1990s, the average farm size can be expected to increase steadily and the number of farm operators will continue to decline. This has historically happened, but it may be accelerated during a period of low returns. In addition, it will be difficult for production agriculture to compete for the younger, well-educated individuals because alternative employment opportunities will be more attractive than farming. Finally, off-farm employment opportunities will play an important role for some farm families as they try to supplement farm income to maintain an acceptable standard of living.

Prepared by:

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Econ Reference Room A
305 Mumford Hall
1301 W. Gregory Dr.
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-9 *June 1990*

Comprehensive Personal Financial Planning

Where do you spend your major efforts, trying to make money or managing your finances? Most people devote very little attention to managing their personal finances; somehow that just happens. For example, do you have well-defined financial goals that you are trying to achieve? Will there be money to put your children through school? How about your investments? Are you putting everything back in the farm or are you diversifying your portfolio with nonfarm financial investments? Are you taking advantage of IRAs, Keogh plans, Simplified Employee Pension plans, or other retirement plan options that allow you to build for retirement years and receive income tax savings in the process? Do you have proper insurance to transfer all insurable risks that you do not want to carry yourself? If you died suddenly, what would happen to those left behind? What would a prolonged total disability do to you and your family? With inflation a reality, what will happen to you financially if you live to age 90 or 100? The questions are nearly endless, but it is possible to broaden your horizons and develop a perspective on comprehensive personal financial planning.

For farmers, the term "personal financial planning" (PFP) is used to focus on the individuals who own a farm operation in contrast to a narrower focus on the finances related specifically to the business. The farm or other employment can then be analyzed in terms of how it fits into the comprehensive personal financial plan. The following elements of a comprehensive plan will be explained: establishment of written financial goals; risk management through use of insurance, savings, and investment strategies; income tax management to maximize after-tax income; retirement planning to ensure adequate financial resources during retirement years; and estate planning that will ensure sufficient lifelong income but will allow for transfer of assets to heirs in a manner that minimizes taxes, treats all heirs fairly, and allows an operation to continue into the future.

Inflation

Financial planning must take inflation into account. If you are now age 40 and believe you could retire on $25,000 in today's dollars, how much money would it take at age 55, 70, 85, or 100 to have the purchasing power of $25,000 today? Let's assume a 5 percent compound rate of inflation. From the mid-1960s to 1981, we had an average annual inflation rate of about 7 percent; during the mid-80s, it declined to approximately 4 percent. Table 1 shows the effects of 5 percent inflation on living costs over time, beginning with $25,000 in today's dollars. Note that the cost more than doubles in each 15-year period. This suggests that today's 40-year-old who wants the equivalent of $25,000 for living expenses will need $108,049 at age 70 to buy the same goods that $25,000 will buy today.

Financial planning is taking on new dimensions as life expectancies increase. A person born in 1985 can expect to live to age 75, up from age 47 in 1900. The over-85 age group is the fastest growing segment of the population.

Table 1. Cost of Living at 15-Year Intervals over a 60-Year Period, Assuming 5 Percent Inflation on $25,000 in Today's Dollars

	Today	15 yr.	30 yr.	45 yr.	60 yr.
Age	40	55	70	85	100
Cost	$25,000	$51,973	$108,049	$224,625	$466,980

How to Think Financially

Three parameters provide a framework for financial planning: net worth, net income, and withdrawals for family living. Net worth (also called equity) represents the dollar difference between total assets and total debt. Net income is revenue generated from labor and management plus net return from investments. Withdrawals represents the amount being spent on current family living consumption. To build net worth, income must exceed expenditures to create savings that can be invested. Earnings from the investment can either be reinvested to further increase net worth, or they can be used to supplement income from labor and management.

Financial planning deals with setting goals that determine whether to increase, decrease, or maintain net worth, and how current and projected income relate to current and projected spending goals. The focus stays on projected spending needs relative to projected income at each point in time, month to month and year to year for the remainder of one's expected life. One alternative for generating spendable funds is to liquidate assets and "use up" the net worth. At the extreme, one might try to have the net worth used up at precisely the time of death. Others would prefer to develop a financial plan that generates sufficient earnings from investments for a comfortable living during retirement years, transferring the assets at death to the next generation. Next, consider the central issues associated with the individual elements of a comprehensive financial plan.

Establishing Goals

It is often said, "If you don't know where you are going, any road will get you there." In contrast, well-defined, realistic, and written financial plans and goals are a first step toward achieving those things that are important in life. Each spouse should separately list short-term and long-range personal and family goals that seem important. Then rank them. Buying cars and furniture, taking vacations, remodeling the home, buying a farm, financing a college education for children, buying new machinery, building a retirement fund, and bringing children into the farm operation are only a few of the possibilities. The spouses should then try to merge their lists into a single statement of goals that they are committed to work toward as a couple. Focus on how the goals relate to net worth and to the amount and timing of expenditures that will be required, and evaluate what income you will need to generate and how much current and future income must be saved. With goals established, turn next to evaluating the adequacy of your insurance program.

Insurance as a Risk Management Tool

Certain events, such as loss of your home by fire, a car accident, or premature death, often create financial catastrophe. Insurance is a way to manage such risks. Rather than risk an occurrence that would be personally devastating, we can pay a known premium and transfer the risk to someone else.

Evaluate the potential consequences of various catastrophic events and try to insure against all those that would create financial burdens you cannot or do not want to assume yourself.

Specific risks that can be insured against include:

- risk of an asset being eliminated or reduced in value,
- risk of income disappearing, and
- risk of an outside claim against your assets and income (for example, a negligence liability claim).

Consider the following risk management strategies.

To protect assets already owned, buy property and casualty insurance, auto insurance, and life insurance (to protect assets from being sold to pay estate taxes and to pay off debts).

To protect current income, buy life insurance (to replace income lost by a breadwinner's death and to pay for expenses that would occur because of another's person's death—for example, the loss of a housewife who cares for small children), and disability insurance (to replace income lost by long-term disability).

To protect assets and income, buy liability insurance (an umbrella policy that goes beyond coverage on other policies), medical insurance (to cover skyrocketing hospital and doctor costs), and long-term health care insurance (to cover nursing home care). Have you recently compared your risks with your insurance coverage on an item-by-item basis? The day after is too late when it comes to insurance. Review your policies, your coverage, and what exposure you and your family have to adverse events that could be insured against.

Savings and Investment

Most people discover that their goals require accumulation of capital and earnings on that capital to facilitate future expenditures.

Saving requires working out a budget plan to spend less money than net earnings, and then having the discipline to follow the plan. The difference, termed "discretionary income," can be invested.

Compound interest has been described as the "eighth wonder of the world." Many people fail to understand and take advantage of this. Table 2 illustrates the amount that would be accumulated over time with $2,000 per year invested at the compound interest rates and for the number of years shown.

Three criteria guide investment decisions: yield, risk, and liquidity. We all want high yield, but we must recognize that the higher the potential yield, the higher the risk. Liquidity is the ability to cash the investment in for cash at any given time and get your principal back. Real estate is generally illiquid, for example, while a money market account at a bank provides instant liquidity.

What are the risks? Loss of some or all of the principal you started with is a major one. Less noticeable but equally important is the risk that the rate of return is less than the inflation rate, which means that the original principal invested plus interest earned would not buy the same bundle of goods the original principal would have bought at the beginning of the investment period. Historically, passbook savings accounts have often earned less than the rate of inflation. Finally, the third risk is lack of liquidity--not being able to get your principal back immediately when needed, but having to wait for a period of time.

Retirement Planning

Typically, people dismiss retirement planning as irrelevant for one of two reasons. The first is that there are many more urgent financial needs than putting money away for retirement when "I am not planning to retire soon." Second is the belief that "my farming operation" is my retirement. This same line of

Table 2. Future Value of Annual Deposits of $2,000 per Year over 10 to 45 Years with Specified Interest Rates

	Interest rates		
Number of years	8 percent	10 percent	12 percent
10	$ 28,973	$ 31,875	$ 35,097
20	91,524	114,550	144,105
30	226,566	328,988	482,665
40	518,113	885,185	1,534,183
45	773,011	1,437,810	2,716,460

reasoning permeates the thinking of a reported 95 percent of our population who cannot retire comfortably and be financially independent at age 65.

The issue becomes how much money will be needed to maintain a comfortable lifestyle after you give up contributing your labor and management to the workplace. At that point, income is available from a return on your investments, pension plans, social security, and sale of assets. If the farm is to provide your retirement income, consider that you will become the landlord and receive only a portion of the total income. Debt may be required to expand the size of your operation to make it possible for children to take it over, and you may feel compelled to buy, build, or rent housing off the farm to allow family members to move on the farm. Further, consider the impact of inflation on the absolute change in dollars needed during a potential 20- to 30-year period beyond age 65 and ask whether your retirement income will grow accordingly. Take into account that medical costs will likely increase with age, and consider how you will pay for care if you cannot always take care of yourself.

The secret to some financial independence during retirement years is to start immediately, putting some money aside to build a retirement fund. The earlier in life you begin, the more benefit there will be from the power of compounding interest. A future newsletter on this topic will go into greater detail. Now, let's turn to estate planning.

Estate Planning

Creation, preservation, and distribution are key elements of estate planning. It should be a lifelong process. Because we do not know when life will end, our estate plan should be prepared to allow for either death or a long life. The federal government currently imposes estate taxes with a progressive rate structure of 18 percent to 55 percent on the value of the estate, less certain credits and deductions. Credits and deductions include funeral and administrative expenses and debts, an unlimited marital deduction, and charitable deductions and bequests.

The size of the estate for an unmarried person must reach $600,000 before the federal tax applies. With a married couple, an unlimited amount can be passed taxfree to the surviving spouse. The concern then becomes tax triggered by the death of the second spouse. The second death may require the sale of many assets to pay the estate taxes, rather than allowing these assets to pass to the heirs as the decedent may have always envisioned.

Start with a will. This document describes how you want your assets distributed in the event of your death, and if there are minor children, it allows you to appoint a guardian. State law will determine this for you if you do not have a will. Typically, people who understand provisions of the state law are convinced that not having a will imposes unnecessary burden and pain on survivors. Update your will every three to five years to stay abreast of changes in your family situation and the latest tax laws.

Estate planning requires the assistance of an attorney who specializes in wills and trusts. The laws are very technical and complex, but they offer lots of flexibility and opportunity for creative estate planning.

Income Tax Management

Underlying all areas of financial planning are the ever-changing tax laws. A reasonable goal for most people is to maximize their after-tax income; maximize their investment growth in tax-favored options; and maximize, at death, the after-tax estate for heirs, allowing for ample income throughout life, however long that life may be.

A key to managing a business and personal financial plan is basic understanding of the income tax model. That means that you understand all types of income that are taxed and all the deductions and credits allowed to offset income in the generation of taxable income. This basic understanding directs attention to the precise records that must be kept and guides ongoing business decisions. With a basic understanding of the tax law, you will benefit more from interaction with the tax specialist who prepares your annual tax returns. Become a continuing student of tax laws and how they affect your life and business.

Summary

Comprehensive financial planning will help you to identify your spending needs at current and projected periods of time and to concentrate on how you can have the money you need available at those times. Your balance sheet and net worth are always at the forefront to help you identify what you want to be doing with your financial position over time. Your balance sheet and life insurance program reveal your estate on an ongoing basis. Personal financial planning is an ongoing process that reflects changing goals and changing family and financial situations. Take charge of your life and your finances!

Prepared by:

Thomas Frey
Extension Specialist
Agricultural Finance

Issued by:

Thomas L. Frey

Thomas Frey

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-10 *June 1990*

Farm and Family Living Income and Expenditures Over a Four-Year Period

In 1989, the total noncapital living expenses of 402 farm families enrolled in the Illinois Farm Business Farm Management Association (FBFM) averaged $28,499--or $2,375 a month for each family (Table 1). This average was 7.8 percent higher than 1988, 12.0 percent higher than 1987, and 14.2 percent higher than 1986. Another $4,321 was used to buy capital items such as the personal share of the family automobile, furniture, and household equipment. Thus, the grand total for living expenses averaged $32,820 for 1989 compared with $29,842 for 1988, or a $2,978 increase per family. Each family spent $918 more for capital items, while noncapital expenses increased $2,060 per family. The sample farms, which were mainly grain farms, were located primarily in central Illinois in a 15-county area bounded by Jacksonville, Peoria, Champaign, and Mattoon.

Figure 1 illustrates the annual capital and noncapital family living expenditures and income and social security tax payments for 1981 through 1989. Total family living expenses increased approximately 3 percent annually during this period. Income and social security tax payments increased the last three years (1987-1989) due to improved farm earnings, elimination of investment tax credit, and an increase in the social security tax rate.

How these families use their funds depends somewhat on the levels of net income from farm and nonfarm sources and the priority of

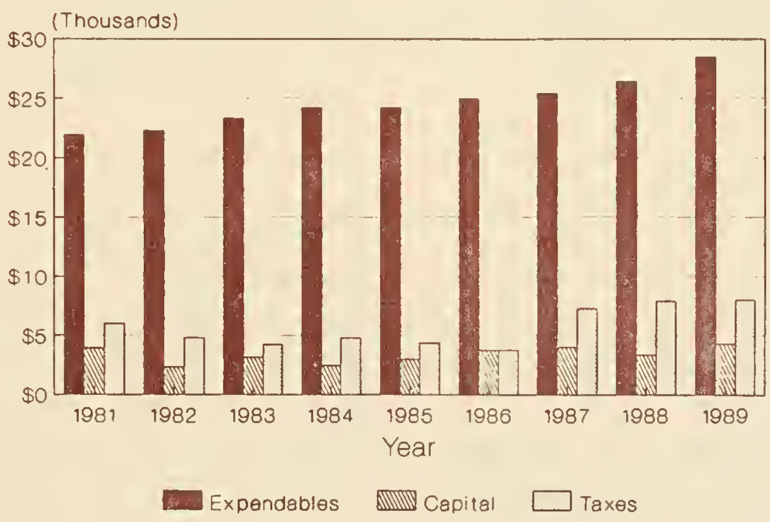


Figure 1. Noncapital family living expenditures and income tax and social security payments, 1981 to 1989.

Table 1. Average Sources and Uses of Funds Over a Four-Year Period and by Noncapital Living Expenses for Selected Illinois Farms

	All records, average per farm				Family of 3 to 5, 1989[a]	
	1989	1988	1987	1986	High third	Low third
Number of farms in sample	402	365	328	324	88	88
Tillable acres farmed	709	661	665	651	858	521
Acres owned	119	116	119	124	116	85
Farm assets, January 1[b]	$335,756	$321,422	$327,059	$361,276	$361,178	$250,024
Farm assets, December 31[b]	335,420	303,897	326,706	356,244	383,886	268,812
Liabilities, January 1	175,939	187,670	203,647	223,214	228,879	128,184
Liabilities, December 31	182,841	175,131	199,282	212,064	242,123	131,113
Net farm income	45,047	17,438	36,388	25,555	48,566	34,181
Sources of dollars						
Net nonfarm income	$ 10,502	$ 9,654	$ 8,682	$ 8,526	$ 11,602	$ 12,751
Money borrowed	90,394	91,872	129,694	123,445	134,095	62,675
Farm receipts	156,717	163,138	176,181	167,938	180,197	140,796
Uses of dollars						
Interest paid	$ 13,850	$ 12,907	$ 14,966	$ 20,421	$ 19,002	$ 10,401
Cash operating expenses	97,737	101,802	111,011	100,983	112,366	97,437
Capital farm purchases	18,299	13,237	13,808	16,603	20,398	17,304
Payments on principal	85,797	104,689	134,024	134,604	124,604	60,207
Income and social security taxes	8,040	7,926	7,287	3,762	8,044	5,073
Net new savings and investment	1,070	-5,739	4,011	-5,206	-2,798	811
Living expenses						
Contributions	$ 1,198	$ 1,049	$ 1,224	$ 1,236	$ 1,732	$ 785
Medical	3,853	3,505	3,264	3,226	4,712	3,004
Insurance, life and disability	2,149	1,997	2,111	2,139	2,666	1,246
Expendables	21,299	19,888	18,840	18,364	30,814	15,830
Total noncapital expense	(28,499)	(26,439)	(25,439)	(24,965)	(39,924)	(20,865)
Capital	4,321	3,403	4,011	3,777	4,354	4,124
Total living expenses	$ 32,820	$ 29,842	$ 29,450	$ 28,742	$ 44,278	$ 24,989
Percentage change, total noncapital living expenses	7.8	3.9	1.9	3.0		

[a] Records were sorted into high- and low-third categories according to total noncapital living expenses.
[b] Modified cost basis except bare land values were held at current values between January 1 and December 31.

the expenditure. In this sample, the 1989 net farm income increased significantly ($27,609 per farm) mainly due to higher grain yields, while the net nonfarm income increased by $848 from 1988. The increase in net farm income in 1989 as compared to 1988 is magnified because 1988 incomes were reduced substantially due to the drought.

The amount of interest expense paid by each farm increased from $12,907 in 1988 to $13,850 in 1989. Interest paid as a percentage of farm receipts increased from 7.9 percent in 1988 to 8.8 percent in 1989. This is the first year since 1983 that the percentage has increased from the year before. The highest that this percentage has been during the decade of the 1980s was 15.3 percent in 1983. The lowest that the percentage has been was 7.9 percent in 1988. As a percentage of cash operating expenses, the interest paid increased from 11.3 percent in 1988 to 12.4 percent in 1989. Farm receipts were $221 per tillable acre, a decrease of $26 per tillable acre, their lowest level during the decade. They were at their highest level in 1987 when they were $265 per tillable acre. Cash operating expenses, including interest, decreased $16 per tillable acre and were at their second lowest level for the decade. Interest payments per tillable acre remained the same at $20, while noncapital living expenditures also remained the same at $40. During the decade of the 1980s, noncapital living expenditures have varied only $3 per tillable acre, ranging from $37 to $40. Machinery and building purchases increased from $13,237 in 1988 to $18,299 in 1989 and were at the highest level for farms in this study since 1982.

Debt-to-Asset Ratio Declines

The sample of farms showed an average debt of 51 cents for each $1 of farm assets as of December 31, 1989; machinery was valued at cost less depreciation. The debt for each $1 of assets was 58 cents on December 31, 1988. Both the value of farm assets and the amount of debt increased from the year before. This debt-to-asset ratio would be lower if machinery were valued at a current market value. Including nonfarm assets would also lower the ratio.

The farms in this sample were 70 acres larger than average for the 7,500 farms in the FBFM record-keeping program. Crop yields averaged about 5 percent above those reported by the Illinois Crop Reporting Service. Net farm income from this sample of farms was slightly higher than the average of all Illinois record-keeping farms. The average net farm income of all Illinois record-keeping farms was $44,156 or $891 less than the average net farm income for this sample. The average living expenditures for farms in this sample are estimated to be 15 to 20 percent above the average of all Illinois farm operators having more than $40,000 gross sales per farm because the average net farm income for this sample is usually higher than the average for all farms.

In 1989, the average operator of these 402 farms was 44 years old. The average family had 3.5 members, with the oldest dependent child averaging 9 years old. The average operator farmed 709 tillable acres; 119 acres, or 17 percent of this land, was owned. The operators kept records so that all sources of funds, both farm and nonfarm, balanced with all uses of funds in a complete monthly cash-flow accounting system.

In the table, the averages per farm for total family living expenses are divided into five categories for 1986 through 1989. The "expendables" category includes cash spent for food, operating expenses, clothing, personal items, recreation, entertainment, education, and transportation. This category also includes selected itemized deductions such as the personal share of interest paid and real estate taxes. Previously, these items have been subtracted from net nonfarm income. This change in processing would explain some of the increase in both family living expendables and net nonfarm income. Cash spent for capital improvements exceeding $250 is not included. The use of a rented house on an estimated 40 to 50 percent of the farms in this sample is not included because these data cover only cash outlays.

The excess on nonfarm taxable income over nonfarm business expense was $10,502 in 1989, or 32 percent of the total living expense; in 1988 the excess was also 32 percent. It includes dividends on stocks, interest on savings and money-market funds, income from other nonfarm investments, and income from off-farm labor performed by family members. Interest earned and left in savings accounts not included in the cash flow is not reflected in the nonfarm income.

Assets and Liabilities Increase

The value of farm assets and the amount of liabilities for this sample of 402 farms increased when compared to a year earlier. The value of farm assets on December 31, 1989, was $31,523 more than a year earlier. The increase reflects larger grain inventories and an increase in land values. After declining for six years in a row, land values have increased in the past two years. At the same time, liabilities also increased by $6,902. These farm operators borrowed $4,597 more than they made in principal payments for the year. This reverses a trend that occurred from 1986 through 1988 when these farms paid more in principal payments than they borrowed. The $18,299, or $26 per tillable acre, spent on capital purchases for machinery and equipment was the highest figure since 1982 when capital purchases averaged $36 per tillable acre.

Although at lower levels compared to earlier years in the decade, interest payments continue to be one of the highest farm expense items. Although the amount of interest paid in 1989 increased compared to 1988, it was the second lowest amount paid since 1980. Interest includes that amount paid on operating, intermediate, and real estate debt. Interest paid increased from 12 percent of total farm operating expense in 1979 to 21 percent in 1983 and dropped to 12 percent in 1989. The $13,850 interest payment in 1989 was 8.8 percent of total cash farm receipts, up from 7.9 percent in 1988.

High-Third/Low-Third Comparison

The records from farm families with three to five persons were sorted into three categories, according to their noncapital living expenses. The high third and the low third were then used to compare family living expenses. The total living expenses for the high-third group averaged $44,278, compared with $24,989 for the low-third group. The high-third group farmed 337 more acres than the other group and owned 14 percent of the land farmed; the low-third group owned 16 percent of the land farmed. The larger farms in the first group had more income for living expenses and to pay income tax. Net farm plus nonfarm income was $60,168 for the high-third group compared with $46,932 for the low-third group. The average age of operators in the high-third group was 42 and the number of family members was 4.2, compared with 40 years of age and 4.0 family members for the other group. Subtracting total living expenses and income and social security taxes paid from the total of net farm and nonfarm income results in a balance of $7,846 for the high-third group and $16,870 for the low-third group. It is interesting to note that although the low-third group had less income than the high-third group, they had more funds remaining after family living and tax expenditures.

Farm operations continue to grow in size. As these operations expand, more funds are flowing in and out of the businesses. More lenders are requiring cash-flow projections and continual monitoring of these projections. It is, therefore, important that more farmers learn how to balance and monitor cash flow each month. Computer program assistance is now becoming available in more service centers such as some FBFM Association district offices. These centers are prepared to offer services to help farmers project monthly cash flow on computer printouts so that they can compare projections with their actual results.

For farm operators with low equity or very high debt-to-asset ratios, this type of accounting is essential. These operators need to account for all of their sources and uses of funds to assist them in making sound financial management decisions.

The data summarized in this process may also serve as a guide in budgeting allowances for family living expenses. For families in this sample, family living expenses averaged $46 for each tillable acre farmed. If the net nonfarm income of $15 per tillable acre is used for living expenses, $31 per tillable acre would have to be generated from the farm business to meet family living requirements. Since 1984, this amount has varied only $2 per tillable acre, ranging from $29 to $31.

Each family must determine how much each acre of crop or each litter of hogs should contribute to their family living expenses. This amount, when added to production costs and other obligations, can help to determine break-even prices needed for products sold.

Prepared by:

Dale H. Lattz
Extension Specialist
Farm Management

Issued by:

Dale H. Lattz

Dale H. Lattz

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-11 *July 1990*

1989 Illinois Farm Property Taxes: No Change!

Farm assessment declines and tax rate increases have resulted in a confusing and difficult-to-understand farm property tax situation in Illinois. The weakened farm tax base began to cause average per-acre taxes to decline in 1984, and the decline continued through 1987. The average per-acre tax paid on Illinois grain farms increased 67 cents to $14.98 per acre in 1988 and held steady at $14.99 per acre in 1989. The average tax on the more productive northern and central Illinois grain farms was $18.67 in 1988 and $18.32 in 1989. For southern Illinois grain farms, per-acre taxes averaged $8.33 in 1988 and $8.40 in 1989.

The 1989 tax payments were based on 1988 assessed valuations and were used by local governments and school districts to fund expenditures in their 1989-90 fiscal and school year. The pressure on the property tax to fund township, county, and school services is reflected in the significant growth in the average farm property tax rate (outside of Cook County). At the beginning of the decade, the average farm property tax rate was 4.66 percent. In 1987, the most recent year for which data are available, the average rate had increased 30 percent to 6.05 percent. Additional growth in tax rates applied to farm property has occurred since 1987 as schools across much of rural Illinois struggle to maintain revenues and meet their budget obligations in light of a weak rural property tax base. In the 1990s, per-acre property taxes on Illinois farms will reflect the interplay of weak to stable certified farmland assessed values and the upward pressure on property tax rates, driven primarily by rural school taxes.

Figure 1a shows per-acre property taxes for a sample of Illinois grain farms from 1976 to 1989. Data for the sample farms in the 68 northern and central Illinois counties and the 34 southern Illinois counties are also included in Figures 1b and 1c. In 1989, the sample included 2,120 grain farms, totaling 1.69 million acres.

The gap between per-acre taxes in southern Illinois and northern and central Illinois continues. The difference between the average per-acre tax in these two regions of Illinois reflects the poor quality soils in southern Illinois counties compared to the other regions of the state; this results in lower farmland assessed valuations. Generally, farm property tax rates are lower in southern Illinois as well. These two factors combined cause per-acre taxes in southern Illinois to be less than half of the average per-acre tax paid by farmland owners in northern and central Illinois. For example, in 1989 the average per-acre tax paid in southern Illinois was 45.9 percent of the average per-acre tax in northern and central Illinois.

The Farm Property Tax Paradox: A Confused Picture

One of the better methods for comparing the property tax burden on Illinois farms is the effective property tax rate. The *effective* property tax rate is simply the ratio of property taxes paid to the market value of farmland. Effective rates for the last 14 years are shown in Table 1. Between 1981 and 1987, effective rates for Illinois farms increased 114.3 percent (from 0.56 percent to 1.20 percent). This growth reflects slightly

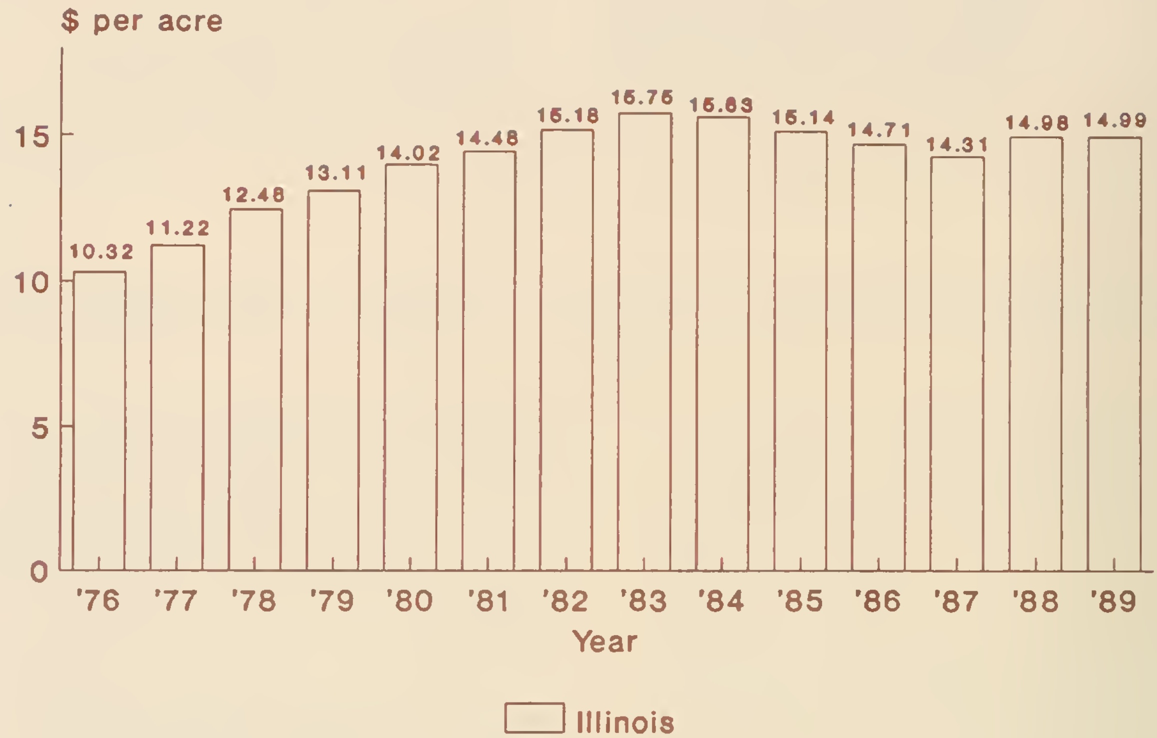


Figure 1a. Per-acre property taxes on Illinois grain farms, 1976 to 1989.

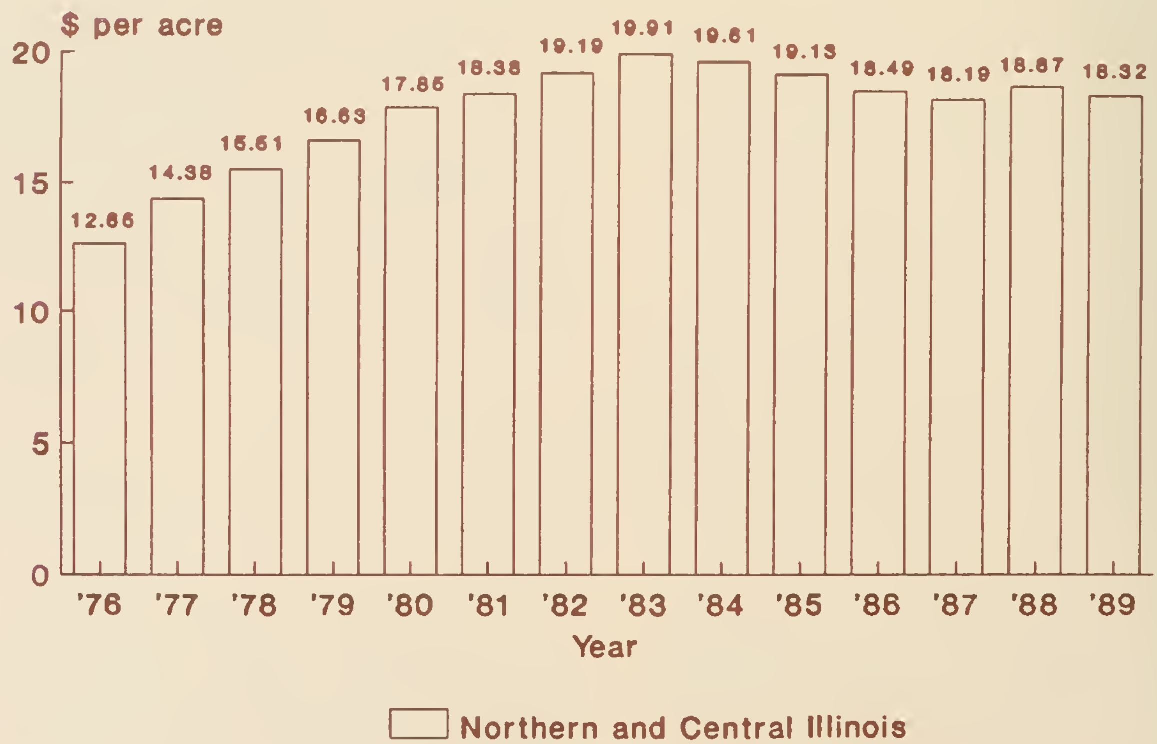


Figure 1b. Per-acre property taxes on northern and central Illinois grain farms, 1976 to 1989.

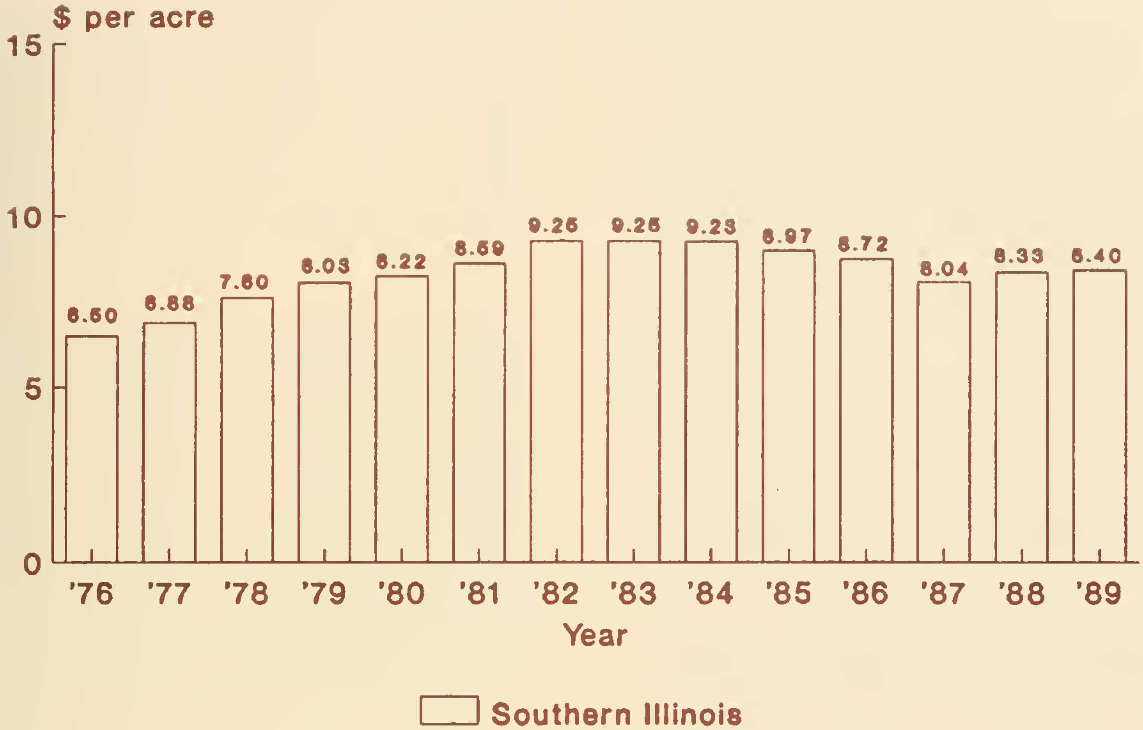


Figure 1c. Per-acre property taxes on southern Illinois grain farms, 1976 to 1989.

Table 1. Effective Property Tax Rates on Illinois Farms, 1976 to 1989

	Effective tax rate, percent[a]		
Tax year	Northern Illinois	Southern Illinois	Illinois
1976	1.02	0.88	0.96
1977	0.93	0.75	0.86
1978	0.74	0.62	0.72
1979	0.72	0.59	0.68
1980	0.69	0.54	0.65
1981	0.60	0.49	0.56
1982	0.58	0.51	0.56
1983	0.66	0.56	0.64
1984	0.85	0.72	0.82
1985	0.99	0.84	0.95
1986	1.11	0.94	1.07
1987	1.31	0.92	1.20
1988	1.14	0.89	1.08
1989	1.02	0.82	0.97

[a]The effective tax rate is the ratio of property taxes to the market value of farmland, computed using only grain farms.

lower per-acre property taxes and a substantial reduction in the market value of Illinois farmland. Growth of this magnitude can be interpreted as a significant increase in the property tax burden on Illinois farmland owners.

Recent strengthening in the market for Illinois farmland more than offset the modest increase in average per-acre farm taxes, resulting in a decrease in the effective farm property tax rate in both 1988 and 1989 (that is, 1.08 percent and 0.97 percent, respectively). The burden of farm property taxes in Illinois in the 1990s, as evidenced by the effective tax rate, will depend on the changes in property tax rates imposed by schools and other rural local governments and the changes in the market value of farmland. If school district property tax levies grow at a faster rate than the farm economy and general inflation pushes up the market value of Illinois farmland, the property tax burden on Illinois farms will resume the familiar upward path of the 1980s.

The events of 1988 and 1989 reversed the trends of the last several years (Figure 2). Between 1983 and 1987, per-acre property tax payments decreased while the property tax burden, measured by the effective tax rate, increased, resulting in the farm property tax paradox--decreasing tax payments and an increasing tax burden. Beginning in 1987, tax burdens have declined while tax payments have increased, although only very slightly in 1989. This pattern resembles the period between 1977 and 1981 when inflation-driven market values for farmland increased significantly faster than increases in property tax payments, resulting in a decreasing property tax burden while property taxes were on the rise.

The pattern of property tax burdens in the 1990s will depend on several factors, but most importantly the movement in average property taxes paid by Illinois farmland owners. Unless inflation exceeds the 4 to 6 percent range and commodity prices grow significantly stronger, market values on Illinois farmland are likely to follow recent patterns of modest strength. Continued growth in property tax rates and possibly average per-acre property taxes, driven primarily by school district tax levies and more stable farmland property tax

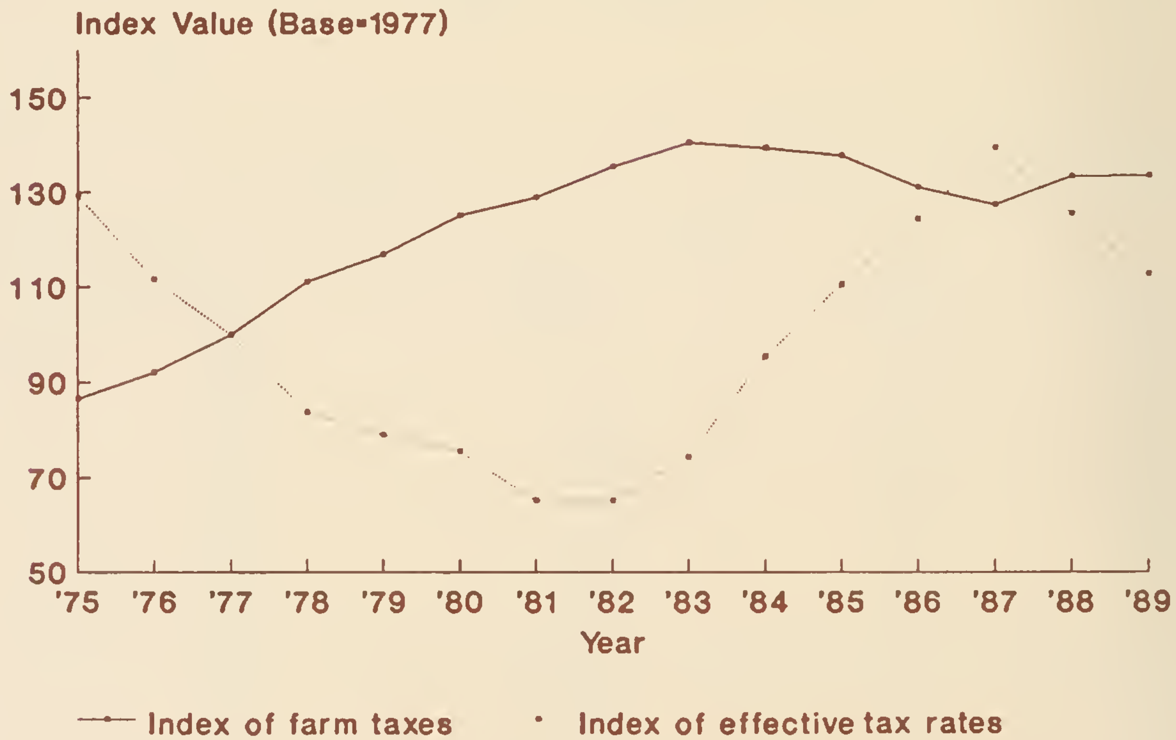


Figure 2. Index of per-acre farm property taxes and effective farm property tax rates, 1975 to 1989.

assessments, may result in an increase in the property tax burden on Illinois farmland owners. A likely pattern is increasing farm property tax burdens and increasing average per-acre taxes or a resumption of the pattern observed briefly between 1982 and 1983 (Figure 2). Of course, major restructuring of the Illinois school finance system with a significant reduction in the dependence on the property tax would reduce the burden of the property tax on farmland owners.

Summary

Average per-acre property taxes paid on Illinois grain farms were stable in 1989 with payments similar to payments made in 1988. In nominal dollars, average per-acre taxes are now close to the level paid in 1981 and 1982. If higher property tax rates offset the lower assessed valuations expected in 1989, 1990, and 1991, the average per-acre taxes paid in 1990, 1991, and 1992 will be at or above the 1989 level. Without continued strengthening of the market value of Illinois farmland, the property tax burden on Illinois farmers, as measured by the effective property tax rate, will resume the familiar pattern of growth experienced through much of the 1980s. Stable to rising average per-acre property taxes and a growing property tax burden is a pattern uncommon to Illinois farm property tax history.

Legislative attention to the state and local public finance system in Illinois, particularly the use of property taxes in school financing, will undoubtedly intensify in the General Assembly in 1991 and 1992. The implications of the pattern of farm property tax levels and burdens for the overall tax policy of Illinois are important. Without legislative changes, the patterns of the future will be determined by the interplay of the farm economy and pressures on rural school districts to provide and finance needed educational services. As farmland assessments are adjusted downward in 1989, 1990, and 1991 to reflect the performance of the farm economy and as school districts continue to put upward pressure on tax rates, per-acre tax payments will likely be stable to modestly weaker compared to 1989. It is very unlikely that the *farm property tax paradox* observed between 1982 and 1987 will be resumed.

Members of the Illinois General Assembly and the Governor of Illinois must develop a deeper understanding of the Illinois public finance system, including farmland property tax patterns. They will then be better equipped to assess current tax policies and practices and to design and implement changes that will meet the demand for schools and other public services while being sensitive to taxpayer interests and overall economic growth. Although the challenge is great, the benefits to be gained from a more balanced and responsive public finance system are worth undertaking.

Prepared by:

David L. Chicoine
Extension Specialist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-12 *July 1990*

Retail Sales in Downstate Illinois, 1977-1988

The Importance of Retail Trade

The 1980s saw sizable variation in economic activity across Illinois. For example, between 1980 and 1985 average county employment declined 3 percent. During this period, employment grew by over 10 percent on average in counties in the Chicago metropolitan area, but it declined by 8 percent in counties in central Illinois. Average county employment declined by over 5 percent in northern Illinois, but it rose by about 2 percent in southern Illinois. Patterns in retail spending would be expected to reflect these patterns in employment change.

There is growing interest in retail activity in Illinois for at least two reasons. One reason is surely related to absolute declines in farm-sector employment. From 1978 to 1986, total farm employment in Illinois declined 13 percent. Total nonfarm employment in Illinois--heavily weighted by employment gains in the Chicago metropolitan area--rose by about 5 percent over the same period. Local planners are interested in knowing the extent to which expanded retail activity might absorb labor resources which leave farming.

Second, in recent years the Illinois Cooperative Extension Service (ICES) has developed a research program and outreach capability in retail trade analysis to help business and community leaders in Illinois towns and counties. This effort has stimulated awareness of retail activity among community planners and offers a tool for retail market analysis. ICES area advisors are now trained in assisting community planners to examine retail trade patterns for their towns. More generally, retail trade analysis is part of a larger effort in community and resource development by ICES to respond to changing circumstances facing the smaller cities, towns, and rural areas of Illinois.

Focus: Downstate Illinois

The discussion centers on real per capita income (PCI) and real total retail expenditures (TRE) for towns in downstate Illinois. Data for Cook and DuPage counties are excluded in order to focus attention on the relatively rural portions of the state. In the remaining 100 counties, data for several towns are unavailable for 1977 or 1988 so that these towns are excluded as well. Overall, data for 980 towns and cities, ranging in population from 70 to over 100,000, are analyzed. Percent changes in inflation-adjusted PCI and TRE are calculated for each town. Town averages for 1977, 1988, and percent change are then calculated for three categories: 1) population size of town, 2) type of economic activity in the county, and 3) geographical location of the county.

Table 1 groups towns by population size. Table 2 divides towns into five groups on the basis of predominant economic activity in the town's county. These county types are: agricultural, Chicago collar, downstate metropolitan counties, manufacturing, and rural diversified counties. Table 3 categorizes towns on the basis of three geographical locations in Illinois that divide the state into thirds from north to south.

Table 1. Percent Change in Real Per Capita Income (PCI) and Real Total Retail Expenditures (TRE) in Illinois Towns by Population Size Categories, 1977 to 1988

Population category	No. of towns	Percent change in PCI: 1977-88[a] 1977[b]	1988[b]	Percent change[b]	Percent in change in TRE: 1977-88[a] 1977[b]	1988[b]	Percent change 1[b]	Percent change 2[c]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
< 250	64	9,540.75	9,233.13	0.62	1,141.77	805.90	-18.95	-29.42
500	189	9,415.39	9,183.23	-0.42	1,609.72	726.72	-47.77	-54.85
2,500	461	10,469.92	10,383.16	0.52	7,523.78	4,536.35	-34.75	-39.71
5,000	105	11,515.43	11,630.30	0.40	29,284.00	23,400.18	-19.85	-20.09
10,000	75	11,307.03	11,495.77	1.81	61,005.64	48,100.95	-10.68	-21.15
15,000	26	11,260.46	11,344.84	1.01	130,739.21	115,667.76	4.67	-11.53
20,000	20	12,549.61	13,675.65	6.51	172,386.44	156,593.83	-12.49	- 9.16
25,000	5	10,964.91	10,651.71	-1.97	163,863.48	119,596.20	-25.85	-27.01
50,000	19	11,950.34	11,779.84	-1.98	335,214.92	254,827.67	-20.59	-23.98
100,000	8	11,771.93	11,123.07	-6.12	798,739.29	612,503.77	-26.33	-23.32
>100,000	2	12,950.29	11,953.92	-7.64	1,684,439.28	1,060,591.61	-36.59	-37.04
Overall	980	10,492.28	10,425.81	0.21	36,056.43	27,522.61	-30.91	-23.67

[a] PCI are in absolute 1988 dollars while TRE are in thousands of 1988 dollars.
[b] Each entry is an average for the towns in the category in column 1. For example, the first entry for "percent change" in column 5 is 0.62 percent, which is the average percent change for the 64 Illinois towns with populations under 250. This number is not the percent change implied by the entries in columns 3 and 4.
[c] "Percent change 2" (column 9) is the percent change implied by the figures in columns 6 and 7, and is the percent change in average TRE by town size. Column 8 is the average percent change in TRE for towns within a given class size.

Table 2. Percent Change in Real Per Capita Income (PCI) and Real Total Retail Expenditures (TRE) in Illinois Counties by Economic Activity, 1977 to 1988[a]

Category[b]	No. of towns	Percent change in PCI: 1977-88 1977	1988	Percent change	Percent change in TRE: 1977-88 1977	1988	Percent change 1	Percent change 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ag	249	9,736.28	9,767.99	2.14	11,597.65	6,368.03	-52.60	-45.09
Collar	94	14,083.90	15,028.49	5.63	80,623.38	82,415.09	38.89	2.22
Dmc	208	11,333.02	10,660.06	-5.25	68,596.79	51,020.72	-24.23	-25.62
Mfg	194	10,313.61	10,282.47	0.68	29,128.97	20,317.70	-38.50	-30.25
Rdc	235	9,260.04	9,192.75	0.43	21,062.70	13,130.01	-35.47	-37.66

[a] See notes for Table 1.
[b] Note the abbreviations for the following categories: Ag = agricultural, Collar = Chicago collar, Dmc = downstate metropolitan counties, Mfg = Manufacturing, Rdc = rural diversified counties.

Data are derived from several sources. Most retail transactions in Illinois are subject to sales taxes. Municipal data for these transactions are collected annually by the Illinois Department of Revenue (*Kind of Business According to Cities Within Each County,* 1977, 1988) and are converted into expenditures by dividing by the state sales tax rate. The state no longer taxes expenditures on food; however, many municipalities do, and municipal food tax receipts divided by municipal sales tax rates give estimates of food expenditures. There was little change in the state's 11.5 million population between 1980 and 1986 (a net increase of 1.1 percent), so population change is not an important determinant of real expenditure change (U.S. Bureau of the Census, *Current Population Reports, Local Population Estimates,* Series P-26, No. 86-ENC-SC). Finally, per capita income data are Census Bureau estimates for incorporated towns in 1979 and 1985.

Trends in Per Capita Income and Total Retail Expenditures

Per capita income (PCI). Real per capita incomes in small towns (with populations under 20,000) rose slightly, on average, between 1977 and 1988 (Table 1 and Figure 1). However, real PCI fell in towns with populations over 20,000. These declines were concentrated in downstate metropolitan counties (Table 2 and Figure 2) and in central Illinois (Table 3 and Figure 3). The largest real increases occurred in the densely populated Chicago collar counties. The average town, however, experienced virtually no growth in real income over this 11-year period.

Total retail expenditures (TRE). Findings for total retail expenditures contrast sharply with those for per capita income. Real retail expenditures fell almost everywhere except in the Chicago collar counties. The average town experienced a decline in real TRE of 31 percent, and real TRE in Illinois outside of Cook and DuPage counties fell 24 percent (Table 1). Declines were dramatic in very small towns (less than 2,500 inhabitants), in the two cities with populations over 100,000, and in agricultural counties. So dramatic are the declines, according to Illinois Department of Revenue *Kind of Business* (*KOB*) data, that results are compared with data from the U.S. Census Bureau (*Census of Retail Trade,* 1977, 1987). *KOB* and census data measure similar but not identical definitions of retail trade. *KOB* data include transactions upon which the state, municipalities, and counties exact sales taxes from the "retailers' occupation tax," the "service occupation tax," and "use taxes." On the other hand, the census defines retail trade as sales in Standard Industrial Classification code industries 52-59, which correspond to the selling of merchandise for personal and household consumption.

Table 4 compares census and *KOB* data. Using census data, real retail sales fell by 9.7 percent outside of Cook and DuPage counties from 1977 to 1987. Using *KOB* data, the decline is 23.7 percent. Thus, both sources show sharp real declines in retail trade. Interestingly, both sources give almost identical measures in 1977. Over the next 10 years, the *KOB* measure falls relatively more, perhaps because retailers have relocated to unincorporated parts of counties, as explained below. It is noteworthy that in nominal terms both measures show a substantial rise in sales. For example, using census data, sales increased by 69 percent from 1977 to 1987. However, the nominal rise masks the underlying real decline.

Implications of the Trends

These data highlight major changes in retail trade in Illinois. Real retail sales have fallen--often dramatically--throughout Illinois, including Cook County (Table 4). Only the Chicago collar counties experienced real growth. These declines occurred despite relative stability in real per capita incomes.

Several factors may be responsible for these trends. First, the Chicago collar counties appear to be gaining market share at the expense of the rest of the state, especially Cook County. Much of this may be due to an increase in population of the collar counties relative to Cook county. Second, the decline in retail sales in downstate counties may be caused in part by relocations of retail stores to unincorporated parts of counties to take advantage of lower property taxes. This may help explain the larger declines using *KOB* (as opposed to census) data, which in our data set excludes sales outside municipalities.

Figure 1. Percent change in per capita income (PCI) and total retail expenditures (TRE) in Illinois towns by population size, 1977-1988.

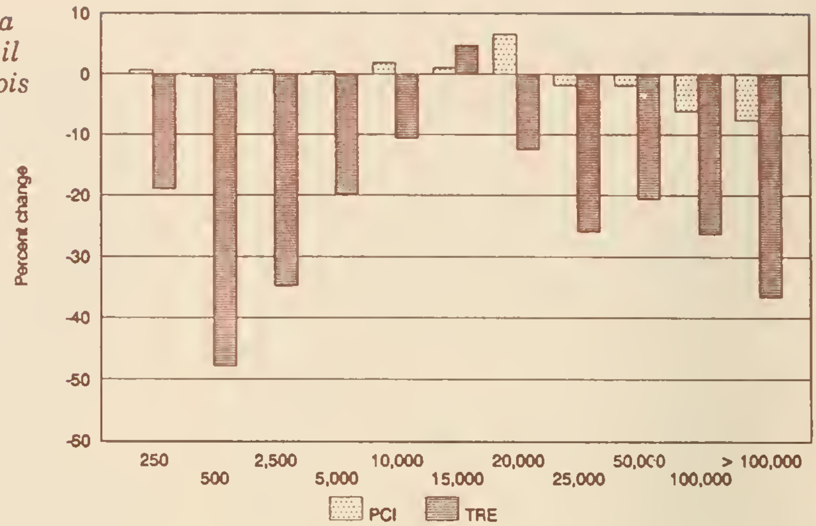


Figure 2. Percent change in per capita income (PCI) and total retail expenditures (TRE) in Illinois towns by economic activity of county, 1977-1988.

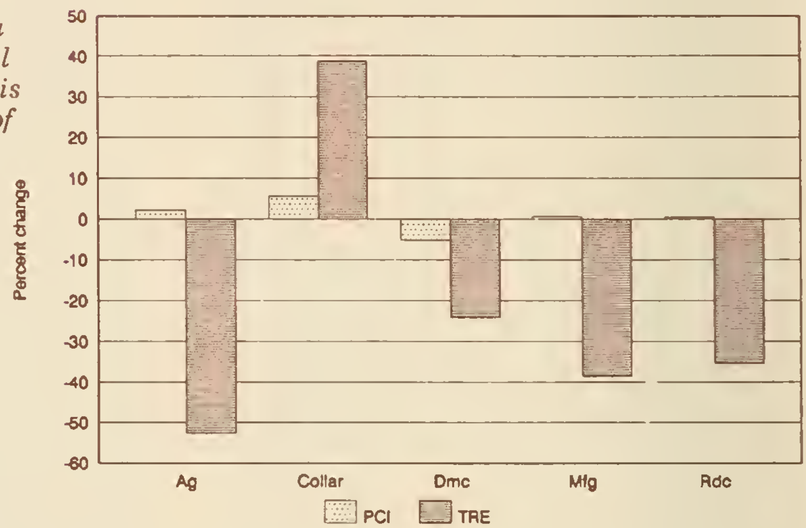


Figure 3. Percent change in per capita income (PCI) and total retail expenditures (TRE) in Illinois towns by region or county, 1977-1988.

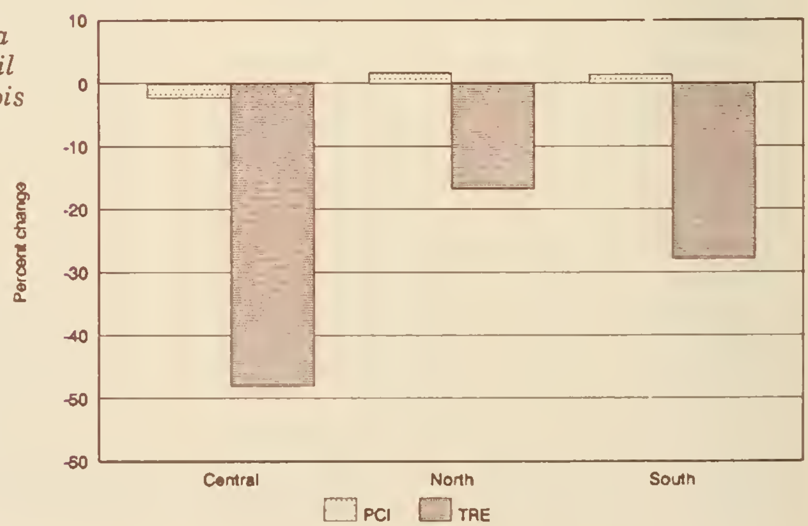


Table 3. Percent Change in Real Per Capita Income (PCI) and Real Total Retail Expenditures (TRE) in Illinois Counties by Region, 1977 to 1988[a]

Region	No. of towns	Percent change in PCI: 1977-88 1977	1988	Percent change	Percent change in TRE: 1977-88 1977	1988	Percent change 1	Percent change 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Central	335	10,433.99	10,050.80	-2.28	35,900.29	23,920.24	-48.05	-33.37
North	340	11,624.74	11,803.80	1.66	46,889.66	40,009.94	-16.73	-14.67
South	305	9,301.51	9,309.78	1.33	24,225.85	17,632.37	-27.84	-27.22

[a] See notes for Table 1.

Table 4. Comparing Illinois Department of Revenue and U.S. Census Bureau Data[a]

	Sales (thousands of dollars) 1977	1987	Percent change 1977 to 1987
U.S. Census Bureau			
Illinois	64,711,226	60,091,494	-7.1%
Cook County	30,489,431	27,154,038	-10.9%
DuPage County	4,593,241	6,195,553	35.0%
Illinois (without Cook and DuPage counties)	29,628,554	26,741,903	-9.7%
Illinois Dept. of Revenue			
Illinois (without Cook and DuPage counties)	29,869,232	22,799,795[b]	-23.7%

[a] Sources: see text. All sales figures are in 1982 dollars and are deflated by the Consumer Price Index.
[b] This figure is for 1988.

Third, the relative stability in downstate per capita incomes masks possible changes in sources of income. For example, employment declines in central and northern Illinois during the 1980s most likely led to declines in earned income and increases in transfer payments. Due to the relative transitory nature of transfer payments, persons may choose to spend smaller fractions of their incomes, thereby reducing retail sales.

These changes in the structure of retail trade are important for at least two reasons. First, they alter the economic bases of communities throughout the state. A smaller retail sector tends to increase the exposure of local economies to surrounding economies. Second, a decline in retail activity shrinks the sales tax base of state and local governments. This requires that governments reduce their activities or find alternative funding sources.

It is not clear whether these recent trends are reversible or whether community development planners should target the retail trade sector in their efforts to revitalize local economies. Answering these questions requires a more complete explanation of sales decline and must address whether local retailers have overlooked market opportunities in their communities.

Prepared by:

John B. Crihfield
Extension Specialist
Regional Economics

Akmal Siddiq
Graduate student in agricultural economics

Issued by:

Richard P. Kesler

Richard P. Kesler
Extension Specialist
Farm Management

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-13 *July 1990*

Guide for Adjusting Custom Rates and Machine Rental Rates for 1990-1991

Custom field operation rates are charges made for the use of field equipment, the time of the operator, necessary mechanical power, other supplies furnished such as tractor fuel, wire, or twine for a baler, and an allowance for risk and overhead. Rental rates are for the use of the power unit and the machine only. There are two methods of establishing the charge for a particular operation. One is the market rates charged. The other is the cost of performing the operation or providing the machine services.

Custom Rate Cost Index

In the absence of current market rates, index numbers of prices paid by farmers for selected classes of expenditures can be used to adjust historical market rates for increased costs. An index of prices paid by U.S. farmers for selected production items directly related to the costs of providing custom farm operations are presented in Table 1. The weightings of the four items for the calculated custom rate cost index are as follows: tractors and self-propelled machinery, 30 percent; other machinery and implements, 25 percent; fuel and energy, 15 percent; and farm wage rates, 30 percent. The base for each index is 1977. The data in the column, "Percent change from previous year," uses the previous year as the base. The custom rate cost index assumes custom rates are based on costs of performing operations and no change in the efficiency of performing the operation.

Costs of Owning and Operating Power and Implements

The cost of using replacement machines is another guide to establishing and adjusting custom rates.

The direct use costs for typical-sized machines at current replacement cost and at average performance levels are presented in Table 2. These direct use costs include depreciation, interest, insurance, repairs, fuel, and labor. No allowance has been made for profits, management, overhead, or risk in these calculations.

There are three direct use values presented in Table 2. The value in the first column covers all direct use costs of power, implement, fuel and labor. The data in the second and third columns are for situations where the power and equipment units are rented out. Costs for both the tractor and implement are included in the second column. The third column has the ownership and repair costs for the implement only.

The estimated costs of using machines and changes in custom rate index are starting points for establishing a custom rate for a particular situation. The supply and demand of machinery and adverse field and weather conditions alter the appropriate custom rate from case to case.

Table 1. Calculated Custom Rate Cost Index and Annual Change, 1977 to 1990

Year	Index for prices paid by U.S. farmers for production items, 1977 = 100[a]: Tractors and self-propelled machinery	Other machinery and implements	Fuel and energy	Wage rates	Estimated custom rate cost index[b]	Percent change from previous year
1977	100	100	100	100	100.0	. .
1978	109	108	104	107	107.4	7.4
1979	121	119	137	117	121.7	13.3
1980	136	132	188	126	139.8	14.9
1981	152	146	213	136	154.8	10.7
1982	165	160	211	143	164.0	5.9
1983	174	171	202	148	169.6	3.4
1984	181	180	201	151	174.8	3.0
1985	178	183	201	154	175.5	.4
1986	174	184	162	160	170.5	-2.8
1987	174	185	166	167	173.5	1.7
1988	181	198	166	172	180.3	3.9
1989	193	208	180	185	192.4	6.7
1990[c]	201	217	187	193	200.5	4.2

[a]Source: *Agricultural Prices*, National Agricultural Statistics Service, USDA.
[b]Tractors and self-propelled machinery weighted by 30 percent; other machinery and implements, 25 percent; fuel and energy, 15 percent; and wage rates, 30 percent.
[c]January-June estimates.

The short-cut method of computing the direct use costs for individual power units and implements is illustrated by the example in the form on page 3. Use this form and the coefficients from Table 3 to estimate cost of performing operations not included in Table 2.

Prepared by:

R.A. Hinton
Professor Emeritus
Farm Management

Issued by:

Richard P. Kesler

Richard P. Kesler
Extension Specialist
Farm Management

Method of Computing Direct Costs of Operating Power and Implements
(+ estimated return for management, overhead, and risk)

		Power unit (tractor or self-propelled unit)	Implement	Total
1.	Machine	Tractor	Coulter chisel plow	
2.	Size	130 Hp	10.5	
3.	Purchase price	$59,500	$9,725	
4.	Ownership and repair cost (see Table 3)	$.00037	$.00145	
5.	Hourly ownership and repair cost (3 x 4)	$22.01	$14.10	
6.	Fuel and lubrication, cost per hour[a]	$7.37	$---	
7.	Total power and implement, cost per hour (5 + 6)	$29.38	$14.10 =	$43.48
8.	Labor cost per machine-hour on the job[b]			$8.92
9.	Total costs per machine-hour on the job for operation (7 + 8)			$52.40
10.	Units of work per machine-hour on the job (acres, bushels, tons, bales)[c]			5.35 units
11.	Total cost per unit of work (9 ÷ 10)			$9.79
			10% rate	25% rate
12.	Adjustment for risk, time for moving from job, other overhead, and profit margin [line 11 x (10 to 25%)]		$______	$______
13.	Estimated machine hire rate per unit of operation		$______	$______

---

[a]

130 PTO Hp x (.069 for gasoline / .0504 for diesel / .0823 for LP gas) x (.75 for light load / 1.00 for avg. load / 1.25 for heavy load) x $.90 price/gal. = $7.37 fuel cost/hr.

[b]

$8.50 wage rate x 1 no./workers x (1.05 for tillage oper. / 1.10 for harvesting oper. / 1.20 for planting, spraying) = $8.92 labor cost/mach. hr.

[c]

126 width in inches x 5.0 mph speed x .85 field efficiency x .01 = 5.35 acres/hr.

Table 2. Direct Costs of Machine Services (Excluding Management, Overhead, and Risk (Guide to Custom and Rental Rates for Farm Equipment)[a]

Field operation	Unit	Power, machine, fuel, and labor costs	Power and machine costs	Machine costs only
Tillage operations				
Moldboard plowing	acre	$ 15.50	$ 11.50	$ 5.00
Subsoiling	acre	15.00	10.50	4.00
Chiseling, 8"-10"	acre	8.00	5.50	1.25
Coulter chiseling	acre	10.00	7.00	3.00
Field cultivation	acre	5.00	3.50	1.50
Offset disking-reg.	acre	7.50	5.50	2.50
-deep	acre	11.00	7.75	3.50
Tandem disking	acre	6.00	4.50	2.25
Disking and applying chemicals	acre	7.50	5.25	3.00
Combination tool (disc-cult.-level)	acre	7.00	5.25	2.75
Packer mulching	acre	5.50	3.75	2.25
Stalk shredding	acre	6.00	4.25	2.25
Row cultivating	acre	6.25	4.25	1.50
Rotary hoeing	acre	2.00	1.25	0.60
Tilling and planting				
Field cultivating and planting corn or soybeans	acre	13.50	11.00	8.00
Packer mulching and drilling soybeans	acre	12.50	10.00	7.00
Planting				
Planting corn or soybeans only	acre	9.50	7.50	4.75
Planting corn or soybeans and applying chemicals	acre	12.00	9.50	6.75
No-till planting	acre	13.75	11.25	8.00
Drilling small grain	acre	7.50	5.50	3.50
No-till drilling	acre	13.25	10.75	7.50
Broadcast seeding	acre	1.50	0.60	0.15
Applying fertilizer				
Anhydrous ammonia	acre	5.00	3.50	1.75
Mixed dry fertilizer	acre	3.25	2.00	1.00
Spraying (excluding materials)				
Field spraying	acre	3.25	2.00	1.00
Fence row spraying	hour	30.00	...	...
Rope wick applying	acre	2.75	1.00	0.20

continued on next page

Table 2. *Continued*

Field operation	Unit	Power, machine, fuel, and labor costs	Power and machine costs	Machine costs only
Harvesting grain				
Combine soybeans or wheat	acre	$ 24.00	$ ...	$ 20.00
Combine corn	acre	29.00	...	24.50
Combine and store	bushel	0.30	...	...
Pick ear corn	acre	36.00	26.00	16.00
Pick and store ear corn	bushel	0.40	...	...
Haul grain	bushel	0.09	0.06	...
Dry grain	bushel point	0.0225	...	0.012
Harvesting forages				
Mowing hay	acre	6.25	3.75	1.25
Mow, condition, windrow	acre	10.50	7.50	4.00
Raking hay	acre	6.00	3.50	1.50
Baling square bales--				
wire tie	bale	0.35	0.18	0.10
twine tie	bale	0.28	0.15	0.08
Baling round bales	bale	5.25	3.75	2.25
Stacking (1 1/2 tons)	stack	10.50	7.50	5.00
Field chop only-- corn silage - 2-row chopper	hour	63.00	48.00	32.00
	ton	3.50	2.00	1.30
Silo filling with 2-row chopper wagons and blowers	hour	104.00	...	...
	ton	5.75	...	...
Tractor rental				
50 PTO Hp—no cab . .	hour	$ ...	$ ...	$ 7.50
65 PTO Hp—no cab	hour	...	...	9.00
85 PTO Hp—no cab	hour	...	...	11.00
105 PTO Hp—no cab	hour	...	...	14.00
105 PTO Hp	hour	...	...	16.50
130 PTO Hp	hour	...	...	21.00
155 PTO Hp	hour	...	...	24.00
180 PTO Hp	hour	...	...	27.00
200 PTO Hp 4 Wd.	hour	...	...	31.00
250 PTO Hp 4 Wd.	hour	...	...	38.00
330 PTO Hp 4 Wd.	hour	...	...	50.00

[a]Adapted from *Computation of Costs of Performing Farm Operations, Pricing and Valuing Farm Input Handbook*, Section 4, No. 3. Assumes $8.50 per hour labor rates, $0.90 diesel fuel costs, and machinery and power costs for new equipment estimated by procedure described in Table 3.

Table 3. Amount of Assumed Use, Assumed Ownership, and Repair Costs per Hour, per Dollar of the List Price, and Rates of Performance Coefficients to be Used in Estimating Costs of Operating Power and Implements

	Number of years of use	Annual hours of use	Cost of ownership and repair per hour, per dollar list price	Speed (mph)	Field efficiency coefficient
Tractor	10	400	.00037	...	...
Basic combine	5	250	.00079	...	...
Corn head	5	150	.00136	2.7	.65
Grain head	5	100	.00188	3.0	.70
Moldboard plow	10	100	.00159	4.5	.80
Other tillage tools	10	100	.00145	5.0	.85
Planter only	10	75	.00201	5.0	.65
Planter with attachments	10	75	.00201	5.0	.60
Grain drill	10	75	.00201	5.0	.68
Fertilizer equipment	10	75	.00198	4.5	.65
Spraying equipment	10	75	.00198	5.0	.65
Mower	10	100	.00199	5.0	.80
Mower--conditioner	10	100	.00199	5.0	.80
Hay rake	10	100	.00159	5.0	.80
Hay baler, forage wagon	10	100	.00159	3.5	.75
Forage harvester, blower	10	100	.00198	2.5	.60
Grain wagon	10	100	.00133	---	---
Manure spreader	10	100	.00198	5.0	.70
Liquid manure spreader	10	100	.00198	---	---

NOTE: Costs were based on five, eight, or ten years of depreciated life, an interest rate of 12 percent, insurance at 1/2 percent, and housing at 1 1/2 percent of the remaining value of the beginning of the year. The purchase price was assumed to be 90 percent of the manufacturer's list price, plus freight and the dealer's setup cost.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-14 *July 1990*

Who Can Buy Farmland?

Where We Are Now in Farmland Prices

Farmland prices reached their low point in the most recent part of the land price cycle in the second half of 1986. High-quality farmland such as the Drummer-Flanagan and Muscatine-Ipava soils that had been selling in 1976 to 1981 at $3,500 to $4,000 per acre (a few tracts sold even higher than $4,000) had dropped to $1,400 to $1,800 per acre by mid-1986. The Cisne and Hoyleton soils and other soils of southern Illinois had dropped from over $2,500 per acre to around $700; some, of course, had sold above $2,500. This was a larger decline in land values than had occurred in the Great Depression from 1929 to 1934. Fortunately, however, the general economy moved ahead nicely over the last five years, and with substantial government subsidies, farm incomes have moved up well during the last three years all across the board, led by dairy and hogs and now including crops and beef cattle as well. Since 1986, land prices have moved up 25 to 30 percent with much of the top land selling in the $1,900 to $2,300 range and some going even higher. Table 1 includes USDA index numbers for land values from 1912 through 1990.

It should be noted that the USDA reported an increase of only 2 percent in Illinois farmland prices from the spring of 1989 to the spring of 1990. Other surveys have indicated a larger increase during the same period of time. The Federal Reserve Bank of Chicago reported a 7 percent increase. Their survey is mailed out to all bankers in their district, which extends across Illinois from about Quincy, Springfield, Shelbyville, and Paris on the south and covers all the state to the north. My own survey, mailed out to farmland appraisers and farmland realtors statewide, showed an increase of 6 percent for the state as a whole. I believe that the USDA underestimated the increase in farmland values for the state of Illinois during 1989 to 1990. A more recent survey of the appraisal members of the American Society of Farm Managers and Rural Appraisers indicated an increase of 7 percent in land values over the last year for the Midwest, which includes Illinois and its neighboring states.

Activity is strong in the areas affected by urban expansion, especially west of Chicago, in the area east of St. Louis called Metro East, and to a lesser extent in the Springfield, Bloomington-Normal, and Champaign-Urbana areas. This may be slowing down soon, however, with a sluggish general economy.

Returns on good farmland with a good lease are still running from 5 to 6 percent on the current value of farmland. During long periods of relative stability in interest rates, the normal relationship of land returns with the government bond rate is that land returns on a current account basis (net rent/land price) are about two-thirds the long-term government bond rate. This means that land prices over the next few years are likely to move sideways or somewhat higher if current conditions continue. It also means that well-financed farmers are able to buy farmland under current conditions, and many should and will be doing so.

Table 1. Index Numbers of Illinois Farmland Values Taken from USDA Farm Real Estate Market Developments

Year	Index numbers (1967= 100)	Year	Index numbers (1967= 100)	Year	Index numbers (1967= 100)	Year	Index numbers (1977= 100)	Year	Index numbers (1977= 100)
1912	25	1922	33	1932	17	1942	23	1952	54
1913	26	1923	32	1933	14	1943	24	1953	55
1914	27	1924	30	1934	15	1944	27	1954	56
1915	27	1925	30	1935	16	1945	29	1955	57
1916	27	1926	29	1936	17	1946	32	1956	60
1917	29	1927	26	1937	18	1947	37	1957	65
1918	31	1928	25	1938	19	1948	39	1958	66
1919	34	1929	25	1939	19	1949	41	1959	71
1920	42	1930	24	1940	20	1950	42	1960	71
1921	40	1931	21	1941	20	1951	50		

Year	Mo.	Index numbers (1967= 100)	Year	Mo.	Index numbers (1967= 100)	Year	Mo.	Index numbers (1967= 100)	Year	Mo.	Index numbers (1967= 100)
1961	Mar.	69	1965	Mar.	84	1969	Mar.	109	1973	Mar.	129
	Nov.	70		Nov.	88		Nov.	108		Nov.	150
1962	Mar.	71	1966	Mar.	94	1970	Mar.	107	1974	Mar.	173
	Nov.	73		Nov.	101		Nov.	107		Nov.	194
1963	Mar.	75	1967	Mar.	100	1971	Mar.	108	1975	Mar.	209
	Nov.	77		Nov.	104		Nov.	110		Nov.	233
1964	Mar.	78	1968	Mar.	104	1972	Mar.	116			
	Nov.	82		Nov.	106		Nov.	124			

Year	Mo.	Index numbers (1967= 100)	Index numbers* (1977= 100)	Year	Index numbers (1967= 100)	Index numbers (1977= 100)	Year	Index numbers (1967= 100)	Index numbers (1977= 100)	Year	Index numbers (1967= 100)	Index numbers (1977= 100)
1976	Feb.	260		1983	413	117						
	Nov.	328		1984	406	115						
1977	Feb.	353	100	1985	296	84						
	Nov.	372		1986	257	73						
1978	Feb.	390	111	1987	236	67						
	Nov.	417		1988	252	72						
1979	Feb.	441	125	1989	277	79						
	Nov.	459		1990	283	81						
1980	Feb.	476	135									
1981	Feb.	503	143									
1982	Apr.	462	131									

The annual index numbers from 1912 through 1960 are the March figures. To extend the annual series, simply use the March index to represent the year up through 1975. In 1976, the first index was taken February 1. The February survey will be a permanent replacement from now on for the March index. The November estimate was discontinued in 1980, and a change in index number base was made in 1981 with the new base set at 100 for February 1977. In the future, only an annual estimate will be made.

*From 1980 on, this index has been calculated and published by John T. Scott, Jr. It is no longer published by the USDA.

Who Buys Farmland?

Farmers have always been and will probably continue to be the largest buyers of farmland. Investors of various kinds--including local professionals and businessmen who are interested in putting part of their savings into farmland and larger investors who want to spread the risk in their investment portfolios--make up the balance. Foreign investors play only a minor, although sometimes conspicuous, role in the land market. In fact, recent USDA figures indicate an actual decline in the amount of farmland owned by foreigners in recent years.

Figure 1 shows the relationships between the net rent on a 50-50 crop-share lease on high-quality farmland and the cost of amortizing the full price of land at the then current mortgage interest rate. The current relationship between net rent and the cost of amortization is back into the more normal range that we saw over most of the period from 1960 to 1972. During this time, if a farmer purchased land, the income would have paid the contracted amortization cost after a few years, assuming a fixed interest rate on the original mortgage.

The full amortization cost is not necessarily the cost of ownership because different land buyers will have different amounts of equity to put into farmland when buying, and the subjective requirement for the amount earned on cash money put into farmland varies considerably from buyer to buyer. Not only do buyers have different proportions of equity when they invest in farmland, but they also have different amounts they can apply to loan payments on the land they purchase.

Who Can Buy Farmland?

Farmers have the advantage over all other investors in farmland investment because they are more knowledgeable about it, especially in their own immediate areas. Farmers can buy smaller tracts of land that would not interest outside investors, and they may be able to make the smaller tracts work better for themselves financially.

Most farmers can put substantially more annual income into buying land when they farm it themselves than the net rent that would be forthcoming to a landlord. This additional income comes from the labor returns and sometimes the depreciation of machinery that would normally accrue to them if they were renting the additional tract of land just purchased. Our farm records show that the labor returns are about $30 per acre and the normal machinery depreciation

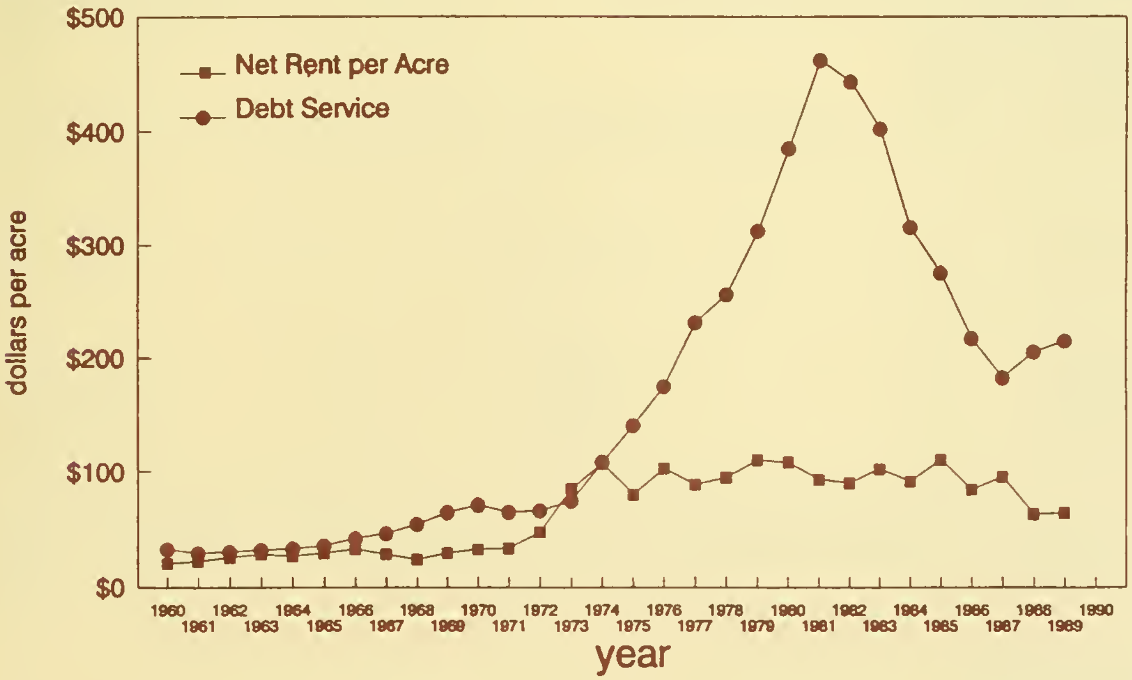


Figure 1. Net return on land with soil productivity rating of 86 to 100 with all land tillable and amortization of full land price.

runs from $25 to $30 per acre. This means that a farmer should be able to pay from $30 to $60 per acre more than the net rent on a current basis to fund the amortization of the land. If a farmer already owns a substantial amount of land, he should also be able to use the net rent on that land that would otherwise be paid out to someone else and apply this income on a land mortgage. This is why most farm mortgages are paid off in seven to ten years, rather than the usual 20 to 30 years that farm mortgages are amortized.

The real question then is not if farmers can buy land at current prices or even at somewhat higher prices, but if they are interested in investing in land to expand their operation. They may want to expand by renting more land or investing their money in a nonfarm investment. This decision depends on many factors--whether additional land can be rented in the farmer's economic farming area, the willingness or ability of the farmer to take on more risk, and the alternative returns from other investments.

When considering alternative returns, the current rate of return alone is not the only consideration. Risk, management, liquidity, and future value are important. Land ownership is valuable for many reasons besides net rent alone, including pride of ownership and status in the community and among one's peers. Other factors include future value of the land due to general inflation and potentially greater demand for farm products, and potential nonfarm use, such as mineral rights or urban encroachment. These values of land ownership simply cannot be captured by a renter. In the final analysis, persons must consider their own alternatives and make their own decisions on land investment.

Prepared by:

John T. Scott, Jr.
Extension Specialist
Land Economics and Farm
Management

Issued by:

John T Scott Jr.

John T. Scott, Jr.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-15 *July 1990*

Certified Farmland Assessed Values for 1991

Farm Property Taxes and Farm Income

The Illinois General Assembly contemplated property tax relief legislation during the last two sessions. An issue in the assessment of the need for property tax relief and in the evaluation of alternatives to providing property tax relief is the "burden" of the tax on taxpayers. A common measure of the property tax used to compare conditions among states and between types of taxpayers is the taxes paid per $1,000 of personal income. Property taxes per $1,000 of personal income for the Illinois economy and Illinois agriculture are presented in Table 1. The ratios for the last five 5-year periods are used because of the year-to-year swings in income that characterize agriculture. Averages are more comparable with the entire economy in which personal income is much more stable from year to year.

For the 5-year period from 1984 to 1988 for Illinois, $35.75 was paid in property taxes for each $1,000 of personal income. For Illinois agriculture, the amount was $271.70 for each $1,000 in farm personal income. The good news for the farm sector is that this figure is down significantly from a high of $404.13 per $1,000 in personal income in the 1980-1984 period. The decline in the ratio is a result of strengthened farm income during the decade and limited declines in property tax extensions on farm property. However, the ratio for farming is still about nine times larger than the ratio for the Illinois economy.

Table 1. Illinois Property Tax Receipts per $1,000 of Personal Income

Selected 5-year period	All sectors	Farm sector
1980-1984	$36.31	$404.13
1981-1985	$36.38	$347.50
1982-1986	$36.26	$373.59
1983-1987	$36.02	$334.59
1984-1988	$35.75	$271.70

SOURCES: Income data from the Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce. Property tax information from *Illinois Property Tax Statistics*, Department of Revenue, Springfield, Illinois. Property taxes are for the payment year.

STATE• COUNTY •LOCAL GROUPS •U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

Table 2. 1990 and 1991 Certified Farmland Equalized Assessed Values (EAV) by Soil-Productivity Index

Productivity index (average management)[a]	1990 certified EAV (90% of 1989 certified values)	1991 certified EAV[b]	Productivity index (average management)[a]	1990 certified EAV (90% of 1989 certified values)	1991 certified EAV[b]
	- - - - dollars per acre- - - -			*- - - -dollars per acre- - - -*	
60	8.16	7.34	96	95.75	93.54
61	8.82	7.94	97	101.70	98.02
62	9.50	8.55	98	107.69	102.58
63	10.15	9.14	99	113.72	107.21
64	10.82	9.74	100	119.80	111.86
65	11.48	10.33	101	125.90	116.61
66	12.15	10.94	102	132.05	121.41
67	12.81	11.53	103	138.23	126.22
68	13.48	12.13	104	144.45	131.11
69	14.29	12.72	105	150.71	136.07
70	14.80	13.32	106	157.17	141.45
71	15.46	13.91	107	163.81	147.43
72	18.28	16.45	108	170.47	153.42
73	21.10	18.99	109	177.11	159.40
74	23.91	21.52	110	183.75	165.38
75	26.72	24.05	111	190.40	171.36
76	29.53	26.58	112	197.04	177.34
77	32.35	29.12	113	203.68	183.31
78	35.15	31.64	114	210.32	189.29
79	37.97	24.17	115	216.96	195.26
80	40.79	36.71	116	223.61	201.25
81	43.60	39.24	117	230.25	207.23
82	46.41	41.77	118	236.89	213.20
83	49.21	44.29	119	243.54	219.19
84	52.04	46.84	120	250.18	225.16
85	54.85	49.37	121	256.82	231.14
86	57.66	51.89	122	263.46	237.11
87	60.47	55.44	123	270.10	243.09
88	63.29	59.46	124	276.75	249.08
89	65.12	63.48	125	283.39	255.05
90	66.94	67.63	126	290.03	261.03
91	71.63	71.83	127	296.68	263.01
92	75.34	76.04	128	303.32	272.99
93	79.26	80.33	129	309.97	278.97
94	84.14	84.65	130	316.61	284.95
95	89.83	89.07			

SOURCE: Illinois Department of Revenue, Certification Memos, 1989 and 1990.

[a]Average management productivity index is the average of the basic and the high-level management indexes as reported in Circular 1156, *Soil Productivity in Illinois*, 1978.

[b]90% of 1990 certified values for productivity index 60-86 and 106-130; actual 1991 calculated values for productivity index 87-105.

The difference in the ratio between the farm sector and the general economy is due to the significantly heavier use of real property (farmland) in the farm sector relative to the entire economy of Illinois and the heavy dependence on taxes on real property in rural regions to finance schools. Achieving more balance between agriculture and the entire economy in property tax per $1,000 of personal income can only be addressed through changes in school finance policy and a shift away from farm property taxes as the base for funding rural education. The 1991 certified farmland assessed values will provide the foundation for 1991 assessed values and taxes paid by farmland owners in 1992.

1991 Certified Assessments by Soil-Productivity Index

Table 2 presents the per-acre certified assessed value of cropland that assessing officers use to determine the 1991 assessed value of farmland throughout Illinois. The cropland indexes range from 60 to 130, and the certified values range from $7.34 to $284.95 per acre. After determining the soil index for a parcel of farmland and the use of the land in farming, the assessor applies the appropriate certified value in calculating the taxable value of the farmland in the parcel.

The 1991 certified values in Table 2 are either 90 percent of the values certified in 1990 or the 1991 values calculated using the use-value formula. The limit law that was passed in 1986 restricts the change in certified values to 10 percent from one year to the next. Since 1986 the certified values have been determined completely by the 10 percent rule and have declined 10 percent each year between 1986 and 1990. For 1991 some certified values are determined by the 10 percent rule, while others are determined by the actual calculations, depending on which value is the larger. The 1991 certified values for soil indexes 60 through 86 and 106 through 130 are equal to 90 percent of the 1990 certified values because the 1991 calculated values were less than these values. The other certified values are the actual calculated values for 1991.

How did this rather confusing outcome occur? The farm economy has not been static in the last half of the 1980s. Several changes have affected the cost of production and the revenues from crop production. The 10 percent limit procedures assumed that conditions in 1991 would be similar to conditions in 1986, which is not the case. The interaction between changing conditions in Illinois agriculture and the 10 percent limit law caused some confusing conditions for the 1991 certified assessed values.

1991 is a transitional year. The 1992 certified assessed values are expected to be determined completely by the calculations using data from the Illinois farm economy. The limit law will not be binding on the 1992 values because these values are not expected to be more than 10 percent less than the 1991 certified values.

The assessment formula used to calculate certified values uses 5-year average data. Calculations are done for each soil index. Commodity prices are one of the major factors influencing the calculations. The 5-year average prices for the major commodities used in the assessment calculations are presented in Table 3 for each assessment year since the adoption of the Illinois Farmland Assessment Law Amendment of 1981. The 1991 calculation uses crop price averages for the period from 1985 through 1989. These prices are: corn $2.19; soybeans $5.96; wheat $3.21; and oats $1.77.

Table 3. Five-year Average Crop Prices, 1981 to 1988

Five-year period	Assessment year	Corn	Soybeans	Wheat	Oats
1976-1980	1982	$2.39	$6.53	$3.17	$1.41
1977-1981	1983	2.48	6.81	3.34	1.52
1978-1982	1984	2.55	6.62	3.52	1.64
1979-1983	1985	2.73	6.73	3.61	1.77
1980-1984	1986	2.87	6.76	3.53	1.85
1981-1985	1987	2.82	6.49	3.36	1.87
1982-1986	1988	2.63	6.10	3.16	1.73
1983-1987	1989	2.46	5.96	3.07	1.68
1984-1988	1990	2.32	6.04	3.08	1.75
1985-1989	1991	2.19	5.96	3.21	1.77

SOURCE: Illinois Crop Reporting Service.

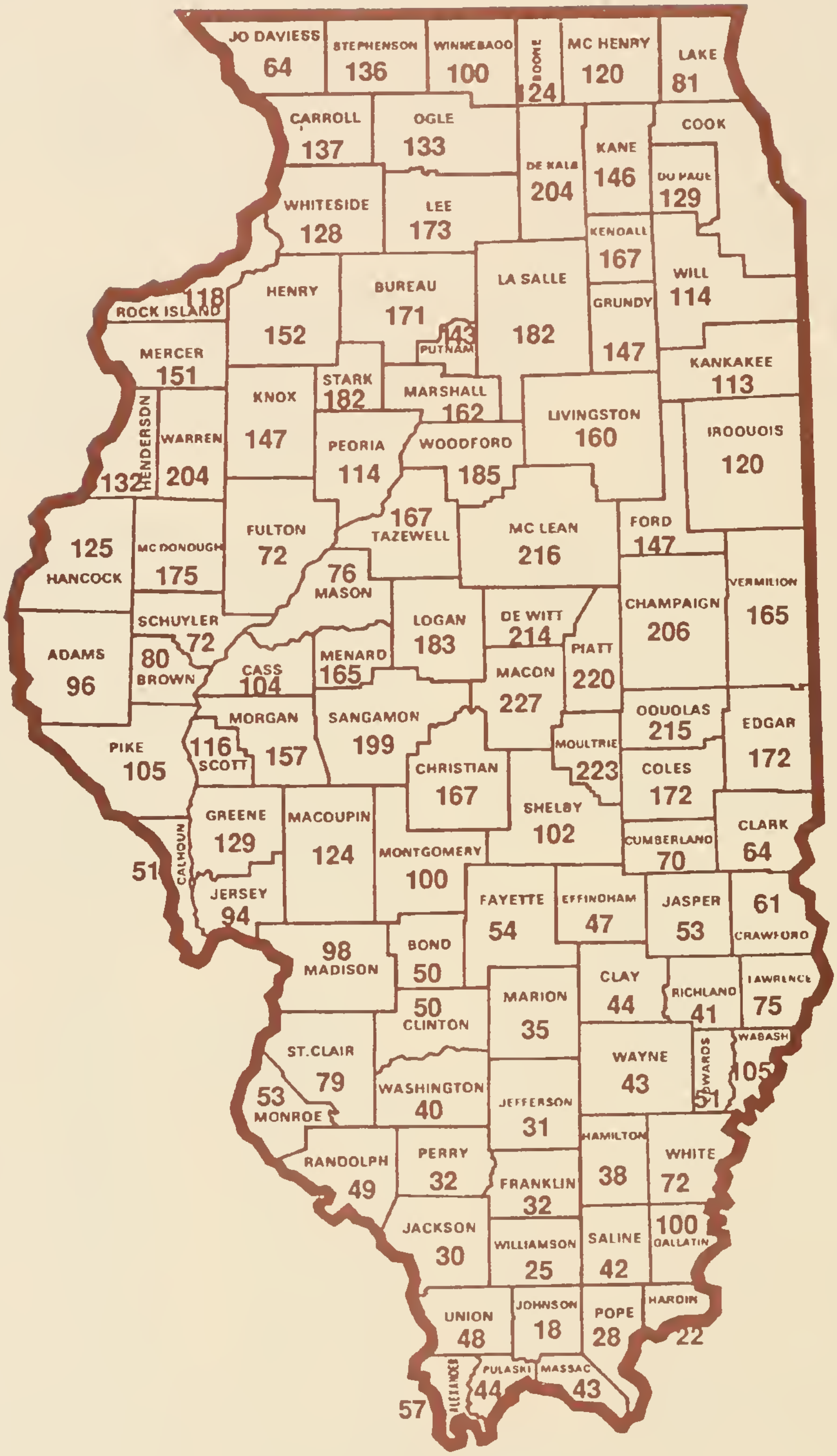


Figure 1. 1991 Certified Average Farmland Assessments (dollars per acre).
SOURCE: Illinois Department of Revenue Certification Memo, April 30, 1990.

Certified Average County Farmland Assessments

In addition to the certified values for each soil index, the Illinois Department of Revenue certifies average county farmland assessed values that reflect the quality of soils in each county and the use of the land in farming in the respective Illinois counties. The map in Figure 1 gives the certified averages for each Illinois county. One of the uses of the averages is to evaluate the assessment of farmland in each county. Using the averages and additional information, the Department of Revenue evaluates whether or not farmland assessments in each county are in compliance with the Illinois Farmland Assessment Law.

County averages range from $18 per acre in Johnson County to $227 per acre in Macon County. The variation in assessed values among Illinois counties is the result of soil productivity, with the most productive soils being assessed significantly above the poorest soils in the state. Accordingly, county average assessments vary as well. Generally, the east central Illinois counties with the most productive soils have the highest average farmland assessments, and southern Illinois counties with the lowest quality soils have the lowest average farmland assessments. Property tax levels vary across the state in a manner similar to the variation in assessed valuations.

Farmland Assessments in the 1990s

With the strengthening of the farm economy in recent years, the calculated assessed values have become more stable, allowing the declining certified assessed values that were following the 10 percent limit law to "catch up" with the calculated values. This catch-up can be seen in Figure 2, where the certified and the calculated assessed values for a soil with a 120 soil-productivity index are presented as an index. Before the 1986 assessments, the calculated and certified values were the same. The 1986 limit law required the use of 1986 values in both 1986 and 1987 and then restricted the change to 10 percent per year. The top line in the figure before 1992 is the certified values. The bottom line before 1992 represents the actual calculated assessed values. Projections are made for years 1992 and after.

Evaluating the information presented in Figure 2 indicates that, beginning with the

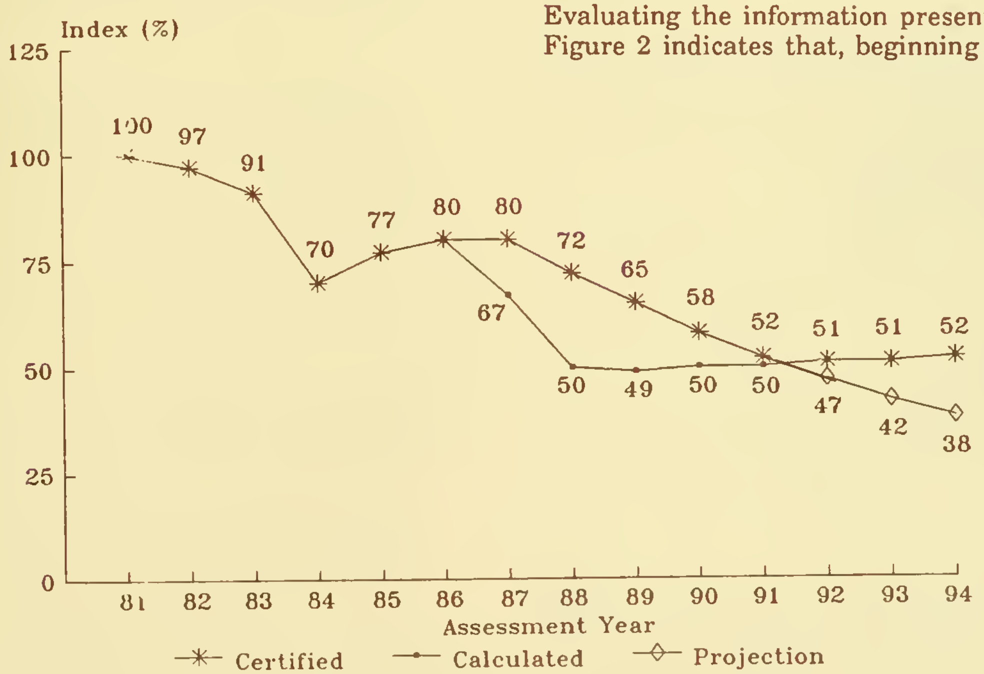


Figure 2. Index of certified and calculated assessed values for soils with a productivity index of 120, 1981 to 1991, with projections to 1994.

1992 certified assessed values, the values calculated using the formula will be used, and assessments on Illinois farms will again be entirely determined by the earnings potential of the use of the land in production agriculture. Beginning with 1992 assessments, more stability can be expected in the farm property tax base. Assessments on farmland are expected to stabilize at about 50 percent of the level that existed at the beginning of the 1980s. This figure is consistent with the percent decline in the market price for farmland during the decade.

While the stabilization of farmland assessments in 1992 will be welcome news to rural school officials, the farm property tax base will be less than 50 percent of the level at the beginning of the 1980s in many rural school districts. With a 50 percent loss in taxing capacity, property tax rates on farms will have to increase 50 percent by the early 1990s just to maintain the *nominal* dollars collected from the farm sector supporting rural schools.

The challenge of financing rural schools with the significant loss in rural taxing capacity without major changes in state school finance policy will be overwhelming and a major part of the challenge faced by the Illinois General Assembly and the new governor as they focus on the major policy issues of the 1990s. Balancing the method of financing schools with pressures for property tax relief will challenge the statesmanship and the leadership of elected officials from across the state.

Prepared by:

David L. Chicoine
Extension Specialist
State and Local Public Finance Policy

Issued by:

David L. Chicoine

David L. Chicoine

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

29

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-16 *August 1990*

Test-Demonstration Farm Results Summarized for Five Counties in Illinois

Results are now available from the five-year study of farms participating in the Illinois Test-Demonstration Farm program. Thirteen farms from Edwards, Jackson, and White counties were involved in the study from 1983 to 1987. The counties worked with the Cooperative Extension Service of the University of Illinois College of Agriculture and the Tennessee Valley Authority (TVA) in order to collect data for the program. The Tennessee Valley Authority financially supports the program.

The Test-Demonstration Farm program emphasizes the "whole-farm approach" to management decisions and farm-business operation. Farmers and their operations are selected for a five-year period. During this time they use and test fertilizer and combinations of other resources that will contribute to increased income. The program has five major objectives:

1. To introduce TVA experimental fertilizers and demonstrate them in educational programs that promote more efficient fertilizer use;
2. To develop a complete, well-balanced, efficient, and profitable farm-business organization on each farm;
3. To encourage cooperators to manage their farms to provide evidence to other farmers of the results of improved practices, efficient enterprises, and profitable farm-business operations;
4. To use the "whole-farm" demonstrations as educational tools to develop agriculture in the community and in the county; and
5. To apply research results from the College of Agriculture to the program.

Results from Edwards, Jackson, and White Counties, 1983-1987

Thirteen farms participated in the five-year Test Demonstration Program. Edwards and White counties each had five cooperating farms while Jackson County ended with three participants during the five year program.

Net worth showed improvement for the three counties over the test period. In Edwards County the net worth averaged $229,746 and experienced a positive change of $26,289 from 1985 to 1987. Jackson County's net worth averaged $96,532 and improved over the five-year period by $17,384. White County showed improvement with an average of $222,942 and an increase of $23,114. Figures 1, 2, and 3 further illustrate the trends in net worth over the program period for Edwards, Jackson, and White counties.

The operator's labor and management earnings for the three counties showed a great deal of variability. The operator's labor and management income for Edward County hit a low in 1984 of -$18,327 but more than doubled by 1987 to $23,363. Jackson County experienced its lowest year in 1983 with -$19,174 but increased to -$6,292 by 1987.

Figure 1. *Operator's Total Assets, Liabilities and Net Worth, Edwards County, 1983-1987. In 1984 two farms exited the program and in 1985 two new farms joined the program.*

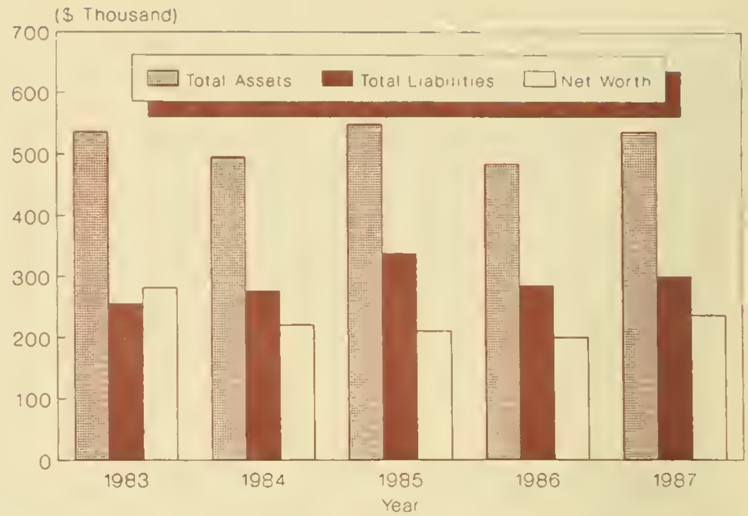


Figure 2. *Operator's Total Assets, Liabilities, and Net Worth, Jackson County, 1983-1987.*

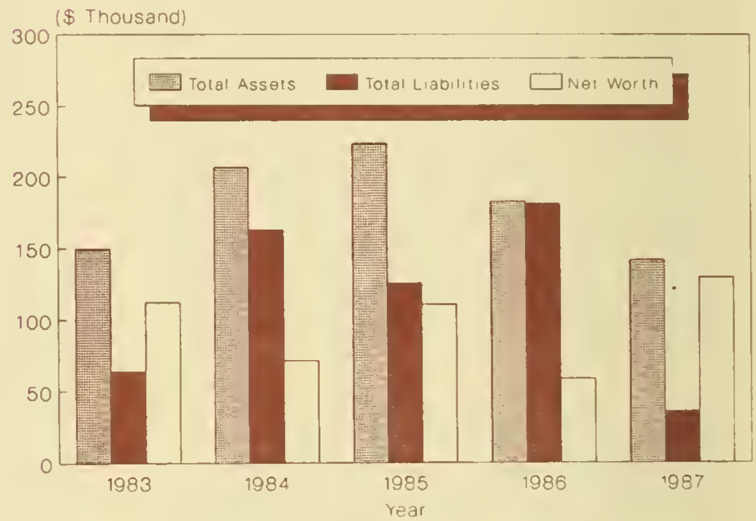
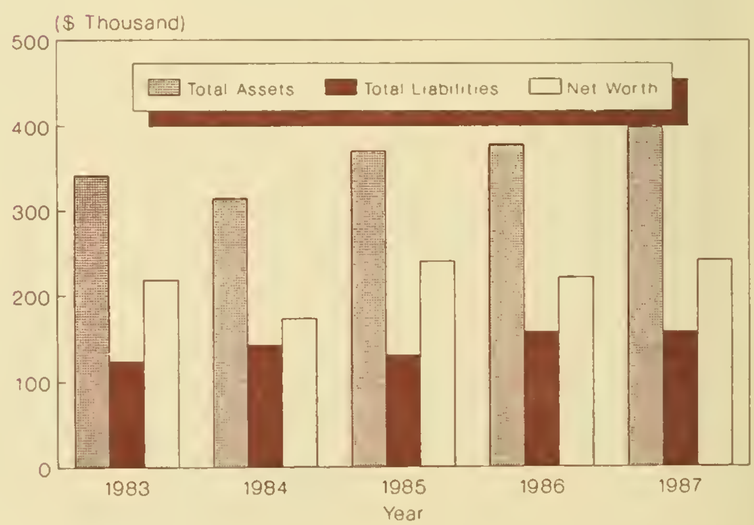


Figure 3. *Operator's Total Assets, Liabilities, and Net Worth, White County, 1983-1987.*



White County encountered its lowest labor and management income in 1985 of -$29,775 but came back in 1986 with $11,145.

The average net farm income over the five years for Edwards, Jackson, and White counties was $4,111, -$5,826, and -$105 respectively (Tables 1, 2, and 3). The counties showed great improvement over the period. Edwards County experienced a 98 percent increase in net farm income from 1985 to 1987 with figures increasing from $485 to $24,682. The Jackson County net farm income reached $2,809 in 1987 compared with -$14,226 in 1983. In White County the net farm income experienced a low in 1985 of -$19,253 but recovered to $11,560 by 1987. The net farm income is defined as the value of farm production less farm products consumed, total operating expenses, and depreciation, plus any gain or loss on machinery or buildings sold. Net farm income also includes the return to farm and family for unpaid labor, the interest on invested capital, and the returns to management.

Average crop yields in bushels per acre for the five years were variable but seemed to show improvements over the period. The corn yields for the three counties followed a similar pattern. All of the counties had their lowest corn yields in 1983. Edwards County's lowest yield was 49, while the lowest yields in Jackson and White counties were 52. The counties experienced their highest yields in 1987. Edwards, Jackson, and White had yields of 120.4, 98, and 126, respectively.

Average soybean yields for the three counties also showed some similarities. Edwards, Jackson, and White counties had their lowest average soybean yields in 1983 of 28, 14, and 26, respectively. Edwards County had its highest yield in 1986 of 41.7. Jackson County's high yield of 40 came in 1987. White County's highest soybean yield of 34 came in 1984 and 1985.

The average yields for wheat were also similar in their patterns for the three counties. Edwards County had its lowest average yield of 28 in 1984. Jackson and White counties experienced their lows of 23 and 30 in 1985. All of the counties experienced their highest average yield in 1987. Edwards, Jackson, and White counties had high yields of 53, 47.7, and 55.6, respectively in 1987.

Soil Test Results

One of the primary goals of the test-demonstration program has been to focus on the soil fertility of farms in the claypan region of Illinois. The soil test results for Edwards, Jackson, and White counties are summarized in Table 4.

According to the 1989-1990 *Illinois Agronomy Handbook*, much of the land in Edwards and White counties is in the region of low phosphorus-supplying power (P-SP) and low cation-exchange capacity (C-EC), whereas Jackson County is divided among regions of low and high P-SP and low, medium, and high C-EC. This places a substantial emphasis on the role of soil testing in order to build and maintain adequate soil fertility and obtain maximum yields. Table 4 summarizes soil test results for 12 of the farms in this study based on averaging the soil tests for fields tested in the same years.

Helpful benchmarks for evaluating the data are as follows: (1) a pH of at least 6.0 is considered a realistic goal (research indicates that a profitable yield response from raising the pH above 6.5 in cash-grain operations is unlikely); (2) available phosphorus levels maintained between 45 to 50 pounds per acre for maximum corn and soybean yields, and (3) soil-test potassium built up at or near 260 pounds per acre will ensure that potassium availability will not limit crop yields. The requirements for P1 and K_2O are based on the P-SP and the C-EC region classifications.

The soil test results indicate that a realistic pH level of 6.0 either was obtained or maintained during the program period on all of the farms shown in Table 4. Given the benchmarks mentioned previously for P1 and K_2O, a majority of the farms showed significant progress with one or both of these areas of soil fertility.

Table 1. Summary of Farm Business Records, Operator's Share, Edwards County Test-Demonstration Averages, 1983-1987

	1983	1984	1985	1986	1987
Number of farms	5	5	5	5	5
Total tillable acres	846	813	898	701	843
Soil productivity rating	58	68	68	56	55
Cash operating income	$159,280	$151,590	$156,336	$219,288	$213,445
Gross farm returns	123,592	133,485	156,374	167,940	156,693
Cash operating expenses	111,763	117,249	133,030	131,501	117,476
Net farm income	-10,932	-9,298	485	15,620	24,682

Table 2. Summary of Farm Business Records, Operator's Share, Jackson County Test-Demonstration Farm Averages, 1983-1987

	1983	1984	1985	1986	1987
Number of farms	5	5	5	3	3
Total tillable acres	405	199	202	178	179
Soil productivity rating	56	57	55	53	53
Cash operating income	$26,036	$24,485	$35,094	$27,378	$29,790
Gross farm returns	21,338	25,738	26,788	17,625	30,205
Cash operating expenses	29,741	26,468	22,405	19,095	18,239
Net farm income	-14,226	-7,038	-2,904	-7,769	2,809

Table 3. Summary of Farm Business Records, Operator's Share, White County Test-Demonstration Farm Averages, 1983-1987

	1983	1984	1985	1986	1987
Number of farms	5	5	5	5	5
Total tillable acres	846	795	820	829	674
Soil productivity rating	58	52	49	50	51
Cash operating income	$118,898	$104,863	$157,028	$105,709	$139,292
Gross farm returns	101,973	120,472	116,288	107,621	115,818
Cash operating expenses	75,122	95,817	109,405	91,333	90,948
Net farm income	1,530	-2,276	-19,253	7,915	11,560

Table 4. Summary of Soil Test Results for Edwards, Jackson, and White Counties Test-Demonstration Farms, 1983-1987

County	Farmer	No. of fields	Year	pH	P1	K_2O
Edwards	Armine Rotramel	52	1983	6.3	75	290
			1986	6.7	61	261
	Charles King	6	1984	6.3	45	225
			1986	6.2	50	291
	Terry Lambert	9	1983	6.8	15	71
			1987	6.5	34	209
	Tom Hortin	8	1983	7.1	71	248
			1986	6.3	44	294
		4	1983	7.2	60	245
			1987	6.9	55	221
	Doyle Hortin	14	1983	6.3	32	162
			1985	6.1	42	176
	Edwards County		First Test	6.7	50	207
	Average	93	Last Test	6.5	48	242
Jackson	James Downen	16	1984	6.4	60	299
			1987	6.5	59	298
	Larry Fritsche	4	1987	6.5	99	231
			1989	6.6	35	151
	Walter Bollmann	16	1983	6.7	19	103
			1985	7.2	34	196
		16	1987	7.1	51	294
	Jackson County		First Test	6.5	59	211
	Average	36	Last Test	6.7	48	248
White	Claude Wilson	4	1984	6.0	25	147
			1986	6.0	44	175
	Ernest Bingman	9	1983	6.6	50	120
			1985	6.7	40	179
	Gary Morris	3	1983	5.8	44	174
			1987	6.8	112	279
		3	1988	6.7	114	296
		4	1984	5.8	47	126
			1988	6.9	68	353
	Gerald Harper	1	1983	7.6	97	245
			1987	5.9	70	385
	White County		First Test	6.4	53	162
	Average	20	Last Test	6.4	67	278

Prepared by:

Victor J. Lenkaitis III and
Beth Weatherby,
Research Assistants, and
Duane E. Erickson
Extension Economist
Farm Management

Issued by:

D. E. Erickson

Duane E. Erickson

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-17 *October 1990*

Farmland Leasing: Cash Rent on Buildings

When Are Buildings Rentable?

Farm buildings, an investment to the landowner, carry continuing costs in maintenance, real estate taxes, and insurance. These buildings may also add costs to the tenant, such as costs for mowing the lots and otherwise maintaining their general appearance. Even if the farm buildings are not very valuable, they do take up space. Most farm building sites are two to five acres or more. So, even if the buildings are not worth much, the value of the land involved needs to be considered since it is not otherwise bringing in an income for its investment unless the landowner is receiving rent on the buildings. If the buildings really have no value (even sentimental) and cannot be rented, then the landowner may be monetarily better off to remove the buildings and use the site for crop production.

Some buildings, especially if they include a liveable house, may have value to someone other than the landowner and the farm operator/lessee. If the buildings and building site are within economic driving distance to an urban area and are accessible by a good, all-weather road, they could be subdivided from the farmland and sold as a country home with space for a horse or a 4-H project. For a site to be sold from a farm, the state of Illinois requires a minimum of one acre. Local county zoning may have greater restrictions, so one should check with county officials before deciding to sell. The selling price depends on the buildings, the site, and the demand in the area. For example, zoning in some northern Illinois counties requires a minimum of 40 acres to be sold to establish a new building site. This makes some sites much more valuable, even with poor or worthless buildings, because an existing set of buildings can be subdivided from a farm with as little as one acre.

During the period of farm consolidation over the last several decades, many farmsteads have already disappeared. Farm buildings that remain are generally more valuable and useful in today's farming operations, so they should command some rent.

Traditionally the crop-share lease has not required rent on buildings except, perhaps, a token land rent on building sites similar to rent paid on hay or pasture. However, this is clearly not fair to the landowner who has significant real value in buildings compared to the landowner who is renting out a farm with no buildings. It is hardly fair for farm operators to live in good homes, store their grain and machinery, and raise livestock in facilities furnished by the landowner when they are farming other land without buildings and paying the same crop-share or cash rent per acre for all the real estate.

Thus, in order to get a return on the investment, the landowner with good, useable buildings must charge the tenant cash rent for the buildings.

Estimating Rental Value on Farm Buildings

To determine the worth of a building, landowners need to ask themselves several questions, such as (1) How much are the buildings actually worth? (2) Are they useful to the tenant? (3) Is the tenant using the buildings and if so, how? (4) Could the buildings be rented to anyone other than the farmland tenant? (5) Are the buildings saleable and at what price?

If the landowner is charging rent on buildings that have no value to the tenant and the tenant is willing to pay it, it may mean that the tenant is willing to pay more than the stated rent for the farmland alone. There may be nothing wrong with this except that either one or both parties are unwilling to say that the rent on the farmland should be higher than it is. This additional cash rent, sometimes called "privilege rent," was more common during the 1970s than it is now. In considering the amount of rent to be paid, the tenant must weigh the following:

- how much it would cost to live someplace else (in the case of a farm home)
- how much better off machinery is stored inside where it can be worked on conveniently
- how much it would cost to store grain somewhere else
- how convenient the buildings are to the farming operation -- time and distance
- what alternatives to these buildings are available and at what cost

Some farmers who rent most of the land they farm own a limited amount of acres where they have a set of buildings or where they put up their own buildings for their headquarters unit.

Once it is established that farm buildings are rentable, what is a fair rent? On housing, it is fairly easy to estimate what the rent should be by finding out what it would cost to rent a comparable home in a nearby town.

Setting a price on grain storage can be figured similarly by finding out what it costs to store grain in nearby elevators, remembering that this charge includes things other than storage, such as elevation (both in and out), and liability that the grain is safe from pillage, insects, fire, and loss of quality. Farm operators take care of most of these things on the farm, so they should not have to pay for anything more than basic storage. A rule of thumb for on-farm grain storage rent is to charge one-half the elevator storage fee.

To set the rental price for other farm buildings, investment theory suggests using a percent of the present value of the investment. This percent is usually conceived as a "built-up" percent. It adds the rate of return on the investment (usually an acceptable rate, given the competitive interest rate in the market for investments of similar quality and risk), the return of the investment (the depreciation), maintenance, insurance, and real estate taxes.

There are at least two general ways of adding depreciation into this formula, depending on the history of the particular building, or how depreciation is viewed on a specific building. All farm buildings are certainly not the same with regard to depreciation or the method of investment recovery.

Case 1
Some buildings, like a machine shed, will last a long time and have little depreciation due to technological change. Recovery of investment cost could be amortized like the return of the principal loaned on an amortized mortgage. For this case, the additional percentage needed above the rate of return on the investment is relatively small. For example, on a building expected to last 20 years with a return of 8 percent on the investment desired, 9.4 percent would be needed to obtain both the return <u>on</u> investment and the return <u>of</u> investment. Then adding, say, 2 percent for maintenance and insurance and 2 percent for real estate taxes gives a "built up" 13.4 percent of the current value of the building for the appropriate rent.

Case 1 example:

Machine shed 60 foot by 100 foot with concrete floor $8 per square foot = $48,000

Amortization rate 20 years (includes interest at 8 percent and depreciation)	9.4 percent
Maintenance and insurance (budget estimate)	2 percent
Real estate taxes 6 percent * 1/3 (tax rate * assessment proportion of value)[1]	2 percent
Rental percent of value	13.4 percent
Total annual rent	$6,432

[1]Tax rate can be obtained from your local real estate tax bill. In many rural areas this ranges from 5 to 7 percent. The assessed value by law should be one-third of the fair market value of the building.

Case 2 example:

Farrowing house 24 foot by 60 foot at $26 per square foot = $37,440

Rate of return on investment	8 percent
Depreciation 20 years straight line	5 percent
Maintenance and insurance	2 percent
Real estate taxes	2 percent
Risk factor	3 percent
Rental percent of value	20 percent
Total rent the first year	$7,488

Case 2

Other buildings, such as a confined hog house, often have shorter economic lives partly because of fairly rapid change in technology, greater wear and tear, and potential risk because of specialized use. A straight-line depreciation over 20 years is more realistic than an amortized return of investment on these types of buildings. Amortization causes most of the return of investment to come in the last half of the amortization period. This is contrary to the actual decline in value, particularly on a hog building. Straight line over 20 years would be 5 percent per year for depreciation in addition to 8 percent for return on investment, 2 percent for maintenance and insurance, 2 percent for real estate taxes, and a risk factor of about 3 percent. This totals 20 percent of the current value for rent on a specialized, short-life building. In this case, however, the rent declines each year as the investment in the building is recovered at the rate of 5 percent per year.

The two cases presented are only examples. In an actual situation, the current value must be estimated carefully. It may require a professional appraiser to estimate the expected economic life remaining in a building, figure rates of return on investment and of investment, and estimate costs as accurately as possible, given the market environment.

Remember: if a building was built, someone must have thought it was worth at least what it cost to build it in addition to the worth of the land it was built on. The question is, What is it worth today to the present owner and user?

Prepared by:

John T. Scott, Jr.
Extension Specialist
Farm Management and
Land Economics

Issued by:

John T. Scott, Jr.

John T. Scott, Jr.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

FARM ECONOMICS
Facts & Opinions

Cooperative Extension Service

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-18 *October 1990*

Financial Projections for a Case Illinois Grain Farm under Three Tillage Scenarios

Many different tillage systems are used today because of the cost of new farm machinery and soil conservation goals. Recent articles have focused on the yields and costs for different tillage systems such as conventional, disk, sweep plow, ridge-till, no-till, and no-till/conventional. Costs for each tillage system can vary dramatically. For instance, conventional tillage methods usually require higher machinery costs while herbicide costs are lower. On the other hand, no-till farming usually has lower machinery costs while herbicide costs are higher.

In this study, the Farm Business and Financial Management Transition Planning Model is used to evaluate the financial performance of an example Illinois grain farm with an existing machinery complement under three tillage systems. The Transition Program is a four-year planning model for farm businesses that uses yields, costs, and prices as well as financial information of a farm business to evaluate the feasibility of changes in the farming operation.

Tillage Scenarios

Mulch tillage, no-till, and the rotational tillage system of no-till/mulch tillage are the three tillage systems compared in the case grain farm.

Mulch tillage: After soybean harvest, the land is chisel plowed in the fall or the spring. In the spring, the soil surface is leveled by discing, herbicides are incorporated, and the seedbed is prepared by the field cultivator prior to planting. After harvesting corn, the tillage operations are the same as after soybeans except an offset disc is used in place of the chisel plow and soybeans are planted. Row cultivation is performed at least once to both corn and soybean acres. The case farm continues to replace existing tillage equipment during the four-year period. The operator trades for a new planter, row cultivator, offset disc, folding disc, chisel plow, and field cultivator over the four-year period. The moldboard plow is used on this case farm, but is not replaced due to the limited amount of acres it is used on each year.

No-till system: Corn and soybeans are planted without pre-plant tillage. On the case grain farm, corn will be planted with a six-row, 30-inch, no-till planter and the soybeans will be planted in 15-inch rows with an eleven-row planter. A five-row piggyback attachment is added to the 6-row planter for 15-inch soybean rows. In this scenario, the tillage equipment and the two larger model tractors are sold since the case farm practices continuous no-till farming.

No-till/mulch tillage rotational system: A tillage rotation where three crops in no-till (corn-soybeans-corn) are followed by one year of tillage before soybean planting. The farming practices for the one year of tillage will be the same as the mulch tillage system. The operator purchases the no-till planter and the piggyback attachment for 15-inch soybean rows and keeps the older model tillage equipment. The tillage equipment is not replaced since the annual usage is only one-fourth of the mulch tillage system. The older of the larger model tractors is traded for the no-till planter in this tillage system due to the limited amount of tillage required.

Case Grain Farm

The case farm has 760 tillable acres—200 acres owned and 560 rented for $90 per acre cash rent. Average yields are 125 bushels per acre for corn and 40 bushels per acre for soybeans for each tillage system. Average prices for the four-year period are $2.25 per bushel for corn and $6 per bushel for soybeans. The farm grows corn and soybeans in rotation and participates in the Feed Grains program for corn with a 10 percent set-aside requirement. The target price for corn is fixed at $2.75 per bushel and the county yield is 120 bushels per acre.

Real estate values are assumed to remain constant over the next four years while the market value of used farm machinery on this case farm will deflate 12.5 percent per year. Interest rates are constant at 11.5 percent per year over the next four years. Living expenses for a family of four are projected to be $20,000 per year. Other costs are primarily averages from the Illinois Farm Business Farm Management (FBFM) record-keeping system.

The tillable acres of this farming operation are suitable for no-till farming and are subject to erosion problems under extensive conventional tillage practices. The machinery complement along with total hours and annual usage of each machine for the case farm are listed in Table 1. Annual usage for each tillage system's equipment was determined from John Siemens' Farm Machinery Selection Program. In each tillage scenario, the operator must trade for a new, six-row, 30-inch planter for the farming operation as the existing planter is obsolete. Equipment replacement is necessary over the next four years if mulch tillage will be the primary farming method.

Table 1. Existing Machinery Complement and Annual Usage in Hours

Equipment	Existing hours	Annual hours
Tractors		
1983 JD 4650 160 HP	1,800	300
1978 JD 4440 140 HP	3,200	200
1988 JD 2750 85 HP	500	250
Combine		
1984 JD 7720 Six row heads	1,200	200
Planter	1,500	100
Moldboard plow	500	50
Chisel plow	1,000	50
Offset disc	1,000	50
Disc	1,000	75
Field cultivator	1,000	100
Row cultivator	1,000	100

College of Agriculture
Cooperative Extension Service
University of Illinois at Urbana-Champaign

November 6, 1990

Dear Subscriber:

In the October, 1990 Issue 90-18 of *Farm Economics Facts and Opinions*, the tillage practices described as the "Mulch Tillage" system will not meet the Soil Conservation Services' (SCS) definition of "Conservation Tillage." According to the SCS, "Conservation Tillage" is a tillage system that maintains a minimum of 30 percent residue cover in the field until canopy closure of the new crop. Because the tillage practice identified as "Mulch Tillage" in the newsletter would fail to meet the 30 percent residue cover requirement, it should be classified as a "Conventional Tillage" system.

Also, because of typographical errors in the cash balances of the No-till system in Table 5, a new page with the corrected figures is enclosed.

Sincerely,

Robert H. Hornbaker
Extension Specialist
Farm Management

The proposed machinery trades or purchases under each tillage system are listed in Table 2.

Table 2. Machinery Purchases by Tillage System

Tillage equipment	List price	Net cost
Mulch Till		
Pull-type planter 6-row, 30-inch	$13,900	$10,000
Row cultivator 6-row, 30-inch	4,500	3,000
Offset disc harrow 13-foot, 24-inch blades	11,750	7,000
Hydraulic fold disc 24-foot, 20-inch blades	16,975	10,000
Mounted chisel plow 12-foot, 12-inch spacings	4,450	3,000
Field cultivator 25-foot	11,955	7,000
No-till		
No-till planter 6-row, 30-inch 5-row, piggyback	$23,000	$17,200
Rotational		
No-till planter 6-row, 30-inch 5-row, piggyback	$23,000	$17,200

List prices for new machinery values were determined from area equipment dealerships and from farm machinery trade publications. Net cost is the price the operator would pay for the equipment less the cash discounts and the trade-in value of the older equipment.

In Table 3, the anticipated repair cost for the equipment is listed by tillage system. Repair expenses were estimated from the existing number of hours for each machine, annual usage, list prices of new farm machinery, and the equipment repair coefficients from the University of Illinois' *Agricultural Engineering Yearbook*. A repair cost of $0 indicates that the machine was sold or traded during the first year.

Yields, crop expenses, and machinery costs for each tillage system are listed in Table 4. Yields and fertilizer costs are the same under each tillage system. Herbicide expenses for these tillage systems are from an eight-year study conducted by the University of Illinois. Seed cost per acre reflects different seeding rates for each tillage system. Average machinery costs for repairs, fuel, and depreciation were calculated on a per acre basis for each tillage system. Mulch tillage shows the highest machinery costs per acre in terms of depreciation, machinery repairs, and fuel costs. But this higher cost is somewhat offset by lower per acre herbicide cost for corn and soybeans under the mulch tillage system.

Table 3. Anticipated Four-Year Repair Costs by Tillage System

Equipment	Mulch till	No-till	Rotational
Tractors			
1983 JD 4650 160 HP	$ 4,612	$ 0*	$ 2,524
1978 JD 4440 140 HP	3,430	0	0
1988 JD 2750 85 HP	894	1,136	894
Planter	1,260	2,080	2,080
Tillage equipment	3,832	0	1,734
7720 combine & heads	14,004	14,004	14,004
General farm	6,000	6,000	6,000
Total repairs	34,032	23,220	27,236
Average per year	8,508	5,805	6,809

*Repair cost of $0 indicates that the machine was sold or traded during the first year.

Table 4. Crop Yield and Cost Data per Acre by Tillage System

Item	Mulch till	No-till	Rotational
Yields			
Corn (bushels)	125.0	125.0	125.0
Soybean (bushels)	40.0	40.0	40.0
Herbicide			
Corn	$20.09	$31.45	$31.45
Soybeans	29.04	40.40	34.70
Fertilizer			
Corn	50.00	50.00	50.00
Soybeans	15.00	15.00	15.00
Seed			
Corn	24.00	25.00	25.00
Soybeans	12.00	18.00	15.00
Machinery expenses			
Repairs	11.20	7.64	8.96
Fuel	9.00	4.50	5.75
Depreciation	19.04	13.16	13.16

Financial Results

Table 5 illustrates the financial outcome of each tillage system over the four-year period. Net after tax income includes net farm income, interest income, and capital gains less federal, state, and social security taxes. Net after tax income is highest for the no-till system over the four-year period. The $58,000 net after tax income figure in 1991 for the no-till system reflects a $45,000 capital gain from the sale of the tractors and the tillage equipment. The rotational tillage system has the second highest net after tax income and percent return of equity. Return on equity (ROE) is calculated by taking net farm income less a charge for unpaid labor and dividing that figure by the average of the beginning and ending net worths for that year. The mulch tillage system has the lowest income figures and profitability ratios.

Table 5. Projected Financial Position under Each Tillage System

Scenario/year	Net return tax income	Percent return on equity	Cash balance	Net worth	D/A ratio
Mulch tillage					
Initial			$10,000	$498,216	0.25
1991	$27,286	4.88%	19,162	495,202	0.25
1992	26,760	4.69	25,044	495,254	0.25
1993	26,666	4.62	30,290	498,201	0.24
1994	27,064	4.68	34,572	504,051	0.22
No-till					
Initial			$10,000	$498,216	0.25
1991	$58,263*	14.23%	62,745	486,479	0.26
1992	29,642	5.50	59,467	493,947	0.23
1993	30,385	5.65	68,061	503,759	0.21
1994	31,999	5.99	77,200	516,591	0.19
Rotational					
Initial			$10,000	$498,216	0.25
1991	$26,254	4.55%	18,165	494,720	0.24
1992	27,665	4.99	25,311	495,179	0.23
1993	29,092	5.39	32,762	499,295	0.21
1994	30,631	5.78	40,516	506,907	0.19

*Net income reflects a $45,000 capital gain from machinery sale.

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

The proposed machinery trades or purchases under each tillage system are listed in Table 2.

Table 2. Machinery Purchases by Tillage System

Tillage equipment	List price	Net cost
Mulch Till		
Pull-type planter 6-row, 30-inch	$13,900	$10,000
Row cultivator 6-row, 30-inch	4,500	3,000
Offset disc harrow 13-foot, 24-inch blades	11,750	7,000
Hydraulic fold disc 24-foot, 20-inch blades	16,975	10,000
Mounted chisel plow 12-foot, 12-inch spacings	4,450	3,000
Field cultivator 25-foot	11,955	7,000
No-till		
Tillage equipment	List price	Net cost
No-till planter 6-row, 30-inch 5-row, piggyback	$23,000	$17,200
Rotational		
Tillage equipment	List price	Net cost
No-till planter 6-row, 30-inch 5-row, piggyback	$23,000	$17,200

List prices for new machinery values were determined from area equipment dealerships and from farm machinery trade publications. Net cost is the price the operator would pay for the equipment less the cash discounts and the trade-in value of the older equipment.

In Table 3, the anticipated repair cost for the equipment is listed by tillage system. Repair expenses were estimated from the existing number of hours for each machine, annual usage, list prices of new farm machinery, and the equipment repair coefficients from the University of Illinois' *Agricultural Engineering Yearbook*. A repair cost of $0 indicates that the machine was sold or traded during the first year.

Yields, crop expenses, and machinery costs for each tillage system are listed in Table 4. Yields and fertilizer costs are the same under each tillage system. Herbicide expenses for these tillage systems are from an eight-year study conducted by the University of Illinois. Seed cost per acre reflects different seeding rates for each tillage system. Average machinery costs for repairs, fuel, and depreciation were calculated on a per acre basis for each tillage system. Mulch tillage shows the highest machinery costs per acre in terms of depreciation, machinery repairs, and fuel costs. But this higher cost is somewhat offset by lower per acre herbicide cost for corn and soybeans under the mulch tillage system.

Table 3. Anticipated Four-Year Repair Costs by Tillage System

Equipment	Mulch till	No-till	Rotational
Tractors			
1983 JD 4650 160 HP	$ 4,612	$ 0*	$ 2,524
1978 JD 4440 140 HP	3,430	0	0
1988 JD 2750 85 HP	894	1,136	894
Planter	1,260	2,080	2,080
Tillage equipment	3,832	0	1,734
7720 combine & heads	14,004	14,004	14,004
General farm	6,000	6,000	6,000
Total repairs	34,032	23,220	27,236
Average per year	8,508	5,805	6,809

*Repair cost of $0 indicates that the machine was sold or traded during the first year.

Table 4. Crop Yield and Cost Data per Acre by Tillage System

Item	Mulch till	No-till	Rotational
Yields			
Corn (bushels)	125.0	125.0	125.0
Soybean (bushels)	40.0	40.0	40.0
Herbicide			
Corn	$20.09	$31.45	$31.45
Soybeans	29.04	40.40	34.70
Fertilizer			
Corn	50.00	50.00	50.00
Soybeans	15.00	15.00	55.00
Seed			
Corn	24.00	25.00	25.00
Soybeans	12.00	18.00	15.00
Machinery expenses			
Repairs	11.20	7.64	8.96
Fuel	9.00	4.50	5.75
Depreciation	19.04	13.16	13.16

Financial Results

Table 5 illustrates the financial outcome of each tillage system over the four-year period. Net after tax income includes net farm income, interest income, and capital gains less federal, state, and social security taxes. Net after tax income is highest for the no-till system over the four-year period. The $58,000 net after tax income figure in 1991 for the no-till system reflects a $45,000 capital gain from the sale of the tractors and the tillage equipment. The rotational tillage system has the second highest net after tax income and percent return of equity. Return on equity (ROE) is calculated by taking net farm income less a charge for unpaid labor and dividing that figure by the average of the beginning and ending net worths for that year. The mulch tillage system has the lowest income figures and profitability ratios.

Table 5. Projected Financial Position under Each Tillage System

Scenario/year	Net return tax income	Percent return on equity	Cash balance	Net worth	D/A ratio
Mulch tillage					
Initial			$10,000	$498,216	0.25
1991	$27,286	4.88%	19,162	495,202	0.25
1992	26,760	4.69	25,044	495,254	0.25
1993	26,666	4.62	30,290	498,201	0.24
1994	27,064	4.68	34,572	504,051	0.22
No-till					
Initial			$10,000	$498,216	0.25
1991	$58,263*	14.23	62,745	486,479	0.26
1992	29,642	5.505	9,467	493,947	0.23
1993	30,385	5.656	8,061	503,759	0.21
1994	31,999	5.997	7,200	516,591	0.19
Rotational					
Initial			$10,000	$498,216	0.25
1991	$26,254	4.55	18,165	494,720	0.24
1992	27,665	4.99	25,311	495,179	0.23
1993	29,092	5.39	32,762	499,295	0.21
1994	30,631	5.78	40,516	506,907	0.19

*Net income reflects a $45,000 capital gain from machinery sale.

The initial cash balance is $10,000. The ending cash balance is highest for the no-till system due to the highest income figures and the sale of machinery. The rotational tillage system has the second highest ending cash balance while the mulch tillage scenario has the lowest ending cash balance. A similar pattern exits for net worth. The farm's initial debt-to-asset (D/A) ratio is .25. The D/A ratio falls to .19 for the no-till and rotational tillage systems but the mulch tillage system has a D/A ratio of .22.

Many farmers argue that no-till farming systems produce lower yields and higher per acre production costs. Table 6 lists the yields or the average cost increase required for the no-till and the rotational tillage systems to match the income of the mulch tillage system. For example, an average corn yield of 116 bushels per acre under the no-till system will match the income of averaging 125 bushel corn per acre under the mulch tillage system over the four-year period. Also, the per acre production costs of the no-till farming system can increase by $18 before average income will be less than the mulch tillage system.

Table 6. Yields and Cost Increase Required for No-till and Rotational Tillage Systems to Match the Income for Mulch Tillage System over the Four-Year Period

	Mulch till	No-till	Rotational
Corn (bushels)	125.0	116.0	123.8
Soybeans (bushels)	40.0	37.1	39.6
Cost increase per acre	$0.00	$18.00	$2.75

Other costs such as labor were not analyzed for this case farming operation. Farmers with limited time during planting season due to off-farm employment or livestock enterprises may find no-till farming attractive. Not only does no-till farming require less machinery, but no-till farming requires less labor time in the field.

Another cost not analyzed for this case grain farm is the replacement of the larger model tractor if this farm chooses mulch tillage as its primary tillage practice. This cost will further increase the per acre cost of machinery for the mulch tillage system. In the other two systems, the larger model tractors would not be replaced due to their limited use or previous sale.

Continuous no-till farming may have some hidden drawbacks. Research has indicated that fertilizer stratification, compaction, weed pressures, and residue build-up problems have occurred in fields that are continuously no-tilled. These problems have reduced yields and increased production costs. Many of these problems are minimized under the rotational tillage system since the soil is tilled every fourth year.

In Summary

In this study, the no-till system shows the highest financial returns, the rotational tillage system has the second highest returns, and the existing mulch tillage system has the lowest returns. Yields and some costs were assumed to remain constant under each tillage system. In contrast, actual yields and costs will vary for each tillage system because of differing soil types and growing conditions. These factors must be considered before selecting a tillage system. However, farmers with land suitable for no-till farming may want to consider the no-till system or the rotational system to reduce soil erosion and lower production costs.

The economic scenarios presented in this paper were developed with the use of the Farm Business and Financial Management Transition Planning Model and the Farm Machinery Selection Program. Both computer programs can be easily applied to specific farming operations or to assumptions that differ from those used in this newsletter.

For more information on the topics discussed in this newsletter, contact Kevin Koenigstein at (217)333-0479. The Transition Program is available through the IlliNet office at (217)244-5956.

Prepared by:

Kevin W. Koenigstein
Agricultural Economist
and Robert H. Hornbaker
Extension Specialist
Farm Management

Issued by:

Robert H. Hornbaker

Robert H. Hornbaker

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

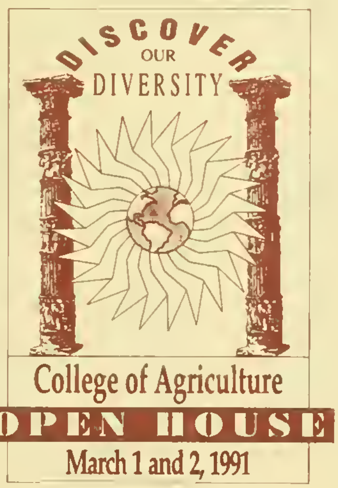
Issue 90-19 *November 1990*

Break-Even Prices for Cattle Feeding in 1990-1991

Cattle feeders should calculate the break-even prices of fed cattle before purchasing replacements. This year, break-even sale prices were determined by computer and include the estimated variable or variable and fixed costs for steer calves, yearling steers, heifer calves, and yearling heifers (see Tables 2 through 13 for various corn and cattle purchase prices).

The calculations are based on the data listed in Table 1. The purchase and sale weights of cattle are considered to be on a pay-weight-to-pay-weight basis. The cattle weights and daily gains are consistent with those reported from northern Illinois feedlots in recent years.

Total feed requirements per head are shown in Table 1. The price of corn silage per ton was computed at 6.7 times the price of Number 2 corn plus variable costs of $6.00 per ton for harvesting and storing the silage. This calculation (1) assumes a ratio of 6.7 bushels of corn per ton to 35 percent dry matter silage; (2) ensures receiving the least market value for the grain; and (3) covers the cost of harvesting and hauling the silage. Silage prices do not include storage costs or storage losses because these will vary from farm to farm. Hay was priced at $70 per ton and supplement at $13.65 per hundredweight for a 40 percent protein supplement containing Rumensin. Rations for heifers include a 40 percent protein supplement and MGA at $14.80 per hundredweight.



STATE• COUNTY •LOCAL GROUPS •U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

Table 1. Data Used to Compute Break-Even Prices for Cattle (Feeder Pig Data Included)

	Steer calves	Yearling steers	Yearling steers	Heifer calves	Yearling heifers	Yearling heifers	Feeder pigs
Purchase weight (pounds)	475	700	800	450	600	700	50
Sale weight (pounds	1,075	1,100	1,200	950	950	1050	225
Daily gain (pounds)	2.2	2.7	3.3	2.0	2.5	2.9	1.5
Number of days fed	270	150	120	250	140	120	120
Death loss (percent)	2	1	1	2	1	1	3
Feed per head:							
Corn (bushels)	50	40	39	45	36	38	10.2
Corn silage (tons)	2.25	1.1	1.1	1.75	1	1	
Hay (pounds)	300	250	250	250	250	250	
Supplement (pounds)	360	225	120	300	200	120	130
Interest rate (percent)	11	11	11	11	11	11	11
Variable costs per head:							
Labor	$ 7	$ 4	$ 4	$ 6	$ 4	$ 4	$2.00
Veterinary	9	6	6	8	9	9	.75
Power & utilities	16	9	9	14	8	8	2.75
Purchase costs	10	14	14	9	12	12	1.00
Selling costs	11	12	12	10	10	10	2.25
Total variable costs	$ 53	$ 45	$ 45	$ 47	$ 43	$ 43	$8.75
Fixed costs per head:							
Labor	$ 13	$ 7	$ 6	$ 12	$ 7	$ 6	$ 8
Buildings and equipment	45	24	24	40	22	22	4
Overhead	5	3	3	4	3	3	1
Total fixed costs	**$ 63**	**$ 34**	**$ 33**	**$ 56**	**$ 32**	**$ 31**	**$ 13**

Table 2. Steer Calves, 475 to 1,075 Pounds, Variable Costs Only

Purchase price of calves ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even sales price needed to cover variable cost per cwt ($/cwt)				
70	57.15	58.67	60.19	61.70	63.21
75	59.59	61.11	62.62	64.14	65.65
80	62.02	63.54	65.06	66.58	68.10
85	64.45	65.97	67.50	69.02	70.54
90	66.88	68.40	69.94	71.46	72.98
95	69.31	70.83	72.35	73.87	75.39
100	71.75	73.26	74.76	76.28	77.80
105	74.18	75.69	77.17	78.69	80.21
110	76.62	78.12	79.58	81.10	82.62
Feed cost/cwt produced*	31.71	34.47	37.23	39.99	42.75

Table 3. Steer Calves, 475 to 1,075 Pounds, Fixed and Variable Costs

Purchase price of calves ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover fixed and variable costs ($/cwt)				
70	63.13	64.65	66.17	67.68	69.21
75	65.57	67.09	68.60	70.12	71.65
80	68.00	69.52	71.04	72.56	74.09
85	70.43	71.95	73.47	75.00	76.53
90	72.86	74.38	75.90	77.42	78.94
95	75.29	76.81	78.33	79.85	81.37
100	77.72	79.24	80.76	82.28	83.80
105	80.15	81.67	83.19	84.71	86.23
110	82.58	84.10	85.62	87.14	88.66
Feed cost/cwt produced*	31.71	34.47	37.23	39.99	42.75

Table 4. Yearling Steers, 700 to 1,100 Pounds, Variable Costs Only

Purchase price of yearling steers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover variable costs only ($/cwt)				
65	60.47	61.56	62.65	63.74	64.83
70	63.83	64.92	66.01	67.10	68.19
75	67.19	68.28	69.37	70.46	71.55
80	70.55	71.64	72.73	73.82	74.91
85	73.91	75.00	76.09	77.18	78.27
90	77.27	78.36	79.45	80.54	81.63
95	80.63	81.72	82.81	83.90	84.99
100	83.99	85.08	86.17	87.26	88.35
Feed cost/cwt produced*	33.22	36.27	39.32	42.36	45.41

Table 5. Yearling Steers, 700 to 1,100 Pounds, Fixed and Variable Costs

Purchase price of yearling steers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover fixed and variable costs ($/cwt)				
65	63.59	64.68	65.77	66.86	67.95
70	66.95	68.04	69.13	70.22	71.31
75	70.32	71.41	72.50	73.59	74.68
80	73.68	74.77	75.86	76.95	78.04
85	77.04	78.13	79.22	80.31	81.40
90	80.40	81.49	82.58	83.67	84.76
95	83.76	84.85	85.94	87.03	88.12
100	87.12	88.21	89.30	90.39	91.48
Feed cost/cwt produced*	33.22	36.27	39.32	42.36	45.41

Table 6. Heifer Calves, 450 to 950 Pounds, Variable Costs Only

Purchase price of heifer calves ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover variable cost per cwt ($/cwt)				
70	59.62	61.14	62.66	64.18	65.70
75	62.22	63.74	65.26	66.78	68.30
80	64.83	66.35	67.87	69.39	70.91
85	67.44	68.96	70.48	72.00	73.52
90	70.05	71.57	73.09	74.61	76.13
95	72.66	74.18	75.70	77.22	78.74
100	75.27	76.79	78.31	79.83	81.35
105	77.88	79.40	80.92	82.44	83.96
110	80.49	82.01	83.53	85.05	86.57
Feed cost/cwt produced*	33.90	36.85	39.80	42.75	45.70

Table 7. Heifer Calves, 450 to 950 Pounds, Fixed and Variable Costs

Purchase price of heifer calves ($cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover fixed and variable cost per cwt ($/cwt)				
70	65.64	67.15	68.67	68.68	70.20
75	68.24	69.76	71.28	72.80	74.32
80	70.84	72.36	73.88	75.40	76.92
85	73.44	74.96	76.48	78.00	79.52
90	76.04	77.56	79.08	80.60	82.12
95	78.64	80.16	81.68	83.20	84.72
100	81.24	82.76	84.28	85.80	87.32
105	83.84	85.36	86.88	88.40	89.92
110	86.44	87.96	89.48	91.00	92.52
Feed cost/cwt produced*	33.90	36.85	39.80	42.75	45.70

Table 8. Yearling Heifers, 600 to 950 Pounds, Variable Costs Only

Purchase price of yearling heifers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even prices needed to cover variable costs only ($/cwt)				
65	61.32	62.46	63.61	64.75	65.89
70	64.61	65.75	66.93	68.07	69.21
75	67.98	69.12	70.26	71.40	72.54
80	71.31	72.45	73.59	74.73	75.87
85	74.64	75.78	76.92	78.06	79.20
90	77.97	79.11	80.25	81.39	82.53
95	81.30	82.44	83.58	84.72	85.86
100	84.63	85.77	86.91	88.05	89.19
Feed cost/cwt produced*	35.23	38.38	41.54	44.69	47.84

Table 9. Yearling Heifers, 600 to 950 Pounds, Fixed and Variable Costs

Purchase price of yearling heifers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even prices needed to cover fixed and variable costs ($/cwt)				
65	64.73	65.87	67.01	68.15	69.29
70	68.05	69.19	70.34	71.48	72.62
75	71.38	72.52	73.66	74.80	75.94
80	74.71	75.85	76.99	78.13	79.27
85	78.04	79.18	80.32	81.46	82.60
90	81.37	82.51	83.65	84.79	85.93
95	84.70	85.84	86.98	88.12	89.26
100	88.03	89.17	90.31	91.45	92.59
Feed cost/cwt produced*	35.23	38.38	41.54	44.69	47.84

Table 10. Yearling Heifers, 700 to 1,050 Pounds

Purchase price of yearling heifers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even prices needed to cover variable costs only ($/cwt)				
60	55.78	56.84	57.91	58.97	60.04
65	59.27	60.33	61.40	62.46	63.53
70	62.76	63.82	64.89	65.95	67.02
75	66.25	67.31	68.38	69.44	70.51
80	69.74	70.80	71.87	72.93	74.00
85	73.23	74.29	75.36	76.42	77.49
90	76.72	77.78	78.85	79.91	80.98
95	80.21	81.27	82.34	83.40	84.47
Feed cost/cwt produced*	31.28	34.47	37.67	40.86	44.05

Table 11. Yearling Heifers, 700 to 1,050 Pounds

Purchase price of yearling heifers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even prices needed to cover fixed and variable costs ($/cwt)				
60	58.16	59.22	60.29	61.35	62.42
65	61.65	62.71	63.78	64.84	65.91
70	65.14	66.20	67.27	68.33	69.40
75	68.63	69.69	70.76	71.82	72.89
80	72.12	73.18	74.25	75.31	76.38
85	75.61	76.67	77.74	78.80	79.87
90	79.10	80.16	81.23	82.29	83.36
95	82.59	83.65	84.72	85.78	86.85
Feed cost/cwt produced*	31.28	34.47	37.67	40.86	44.05

Table 12. Yearling Steers, 800 to 1,200 Pounds, Variable Costs Only

Purchase price of yearling steers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover variable costs only ($/cwt)				
60	54.33	55.30	56.27	57.23	58.20
65	57.82	58.79	59.76	60.72	61.69
70	61.31	62.28	63.25	64.21	65.18
75	64.80	65.77	66.74	67.70	68.67
80	68.29	69.26	70.23	71.19	72.16
85	71.78	72.75	73.72	74.68	75.65
90	75.27	76.24	77.21	78.17	79.14
95	78.76	79.73	80.70	81.66	82.63
Feed cost/cwt. produced*	28.25	31.15	34.05	36.94	39.84

Table 13. Yearling Steers, 800 to 1,200 Pounds, Variable and Fixed Costs

Purchase price of yearling steers ($/cwt)	Price of corn per bushel $1.75	$2.00	$2.25	$2.50	$2.75
	Break-even price needed to cover fixed and variable costs ($/cwt)				
60	56.58	57.55	58.52	59.48	60.45
65	60.07	61.04	62.01	62.97	63.94
70	63.56	64.53	65.50	66.46	67.43
75	67.05	68.02	68.99	69.95	70.92
80	70.54	71.51	72.48	73.44	74.41
85	74.03	75.00	75.97	76.93	77.90
90	77.52	78.49	79.46	80.42	81.39
95	81.01	81.98	82.95	83.91	84.88
Feed cost/cwt produced*	28.25	31.15	34.05	36.94	39.84

*The hundredweight produced includes a deduction in weight for death loss.

Worksheet: My Estimate

Kind of livestock to feed: Cattle ______________ Pigs ______________

Number to buy: _________ Date to buy: __________ Days on feed: _________

1. Determine cost of producing finished animal:

a. Cost of feeder: _______ weight X $_______ price = $_________
Transportation cost to farm: $_________
Total feeder cost $_________

b. Feed cost per head: Amount X Price = Cost

	Amount		Price		Cost
Corn, bushels	________	X	$________	=	$________
Small grain, bushels	________	X	$________	=	$________
Supplement, pounds	________	X	$________	=	$________
All hay, tons	________	X	$________	=	$________
Silage, tons	________	X	$________	=	$________
Pasture, days	________	X	$________	=	$________
			Total feed cost		$_______

c. Other costs:

1.5% for feeder pigs
2.0% for calves

Death loss: $_____ feeder cost X (or 1.0% for yearlings)$_______

Interest: $______ feeder cost X _____% of interest rate
for _______ year $_______

	Average per head: Hogs	Long-fed calves	Short-fed yearlings	
Veterinary, medical, and other	.75	9.00	6.00	$_______
Building, equipment, and power	4.00	61.00	33.00	$_______
Labor	6.75	20.00	11.00	$_______
Overhead	1.00	5.00	3.00	$_______
Selling and buying costs	3.25	21.00	26.00	$_______
	15.75	116.00	79.00	$_______
Total, other nonfeed costs:				$_______

Total: Feeder, Feed, and Other Costs Per Head $_______

2. Determine break-even net selling price[a] needed to cover costs:

Divide: total cost per head / sales weight [b] = $_______ X 100 = $_______

Sales price per hundredweight: $_______

[a]Market price for livestock, less trucking, commission, and yardage.
[b]Shrinkage is assumed to be 4 percent from feedlot market weight.

Prepared by:

Duane E. Erickson
Extension Economist
Farm Management

Issued by:

D. E. Erickson

Duane E. Erickson

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS

Ag. Library - Serials Clerk
226 Mumford Hall
1301 West Gregory Drive
CAMPUS MAIL

Cooperative Extension Service

FARM ECONOMICS
Facts & Opinions

Department of Agricultural Economics • College of Agriculture • University of Illinois at Urbana-Champaign

Issue 90-20 *December 1990*

How the Food, Agriculture, Conservation, and Trade Act of 1990 will Affect Illinois Farmers

The Food, Agriculture, Conservation, and Trade Act of 1990, signed into law on November 28, sets the course of U.S. agricultural and food policy through 1995. It is also one of the most complex pieces of agricultural legislation ever passed by Congress. Although in many ways the Act is an evolution of past policy, it makes some important changes that will affect every Illinois farmer who participates. The 1990 Budget Reconciliation Act also includes provisions affecting farm program operations.

The 1990 legislation seeks to accomplish three major policy goals: to reduce the federal deficit, to improve agricultural competitiveness, and to enhance the environment. To reach these goals, new features have been added to farm programs beginning in 1991.

The Triple-Base Plan--Reduced Costs and Reduced Benefits

The most significant influence in writing the new act was the budget deficit and the intense pressure to cut program costs. A major part of the cost-cutting effort will come through the "triple-base" plan, which reduces the acreage on which deficiency payments will be paid by 15 percent.

This 15 percent is calculated from the total crop base acreage before the acreage reduction is determined. Here's how the program would work on a typical Illinois farm with a 100-acre corn base. In 1991, the acreage reduction requirement (set-aside) will be a minimum of 7.5 percent; the permitted acreage that could then be planted would be 92.5 acres. Under the triple-base plan, the acreage eligible for payment would be 92.5 minus 15 or 77.5 acres. On the 15 nonpayment acres, a farmer could plant any program crop, such as corn or wheat; oilseeds, including soybeans, canola, or sunflowers; or nonprogram crops, except for fruits and vegetables; plus other crops specified by USDA.

The crops produced on the 15 percent "triple-base" or "normal flex" acres are not eligible for deficiency payments but will be eligible for applicable commodity loans. Also, a flexibility provision in the new law permits a farmer to plant other crops on an additional 10 percent of his base acreage without losing his historic crop acreage base. Guidelines for planting "optional flex" acres are similar to those in the triple-base plan. However, soybean plantings may be limited on this 10 percent if supplies or market conditions threaten to lower prices below 105 percent of the loan rate.

The triple-base and flexibility features provide new production choices, but the Act protects the historic crop acreage bases that offer special eligibility for farm program benefits and affect land values if the land is sold.

Target Prices and Loan Rates

Target prices under the new law were frozen at $2.75 a bushel for corn, $2.61 for grain sorghum, $2.36 for barley, $1.45 for oats, and $4.00 for wheat. Deficiency payments for the 1994 and 1995 crops for wheat and feed

STATE• COUNTY •LOCAL GROUPS •U.S. DEPARTMENT OF AGRICULTURE COOPERATING
The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

grains will be computed using a 12-month instead of a 5-month average price.

Wheat and feed grain loans will be calculated at 85 percent of average farm prices for the previous five years, with high and low years excluded. Because the 1985 Act set the basic loan rate at 75 to 85 percent of market prices, loan rates could be slightly higher from 1991-95. Further reductions up to 10 percent may be made by the Secretary of Agriculture based on ending stocks-to-use ratios. The Secretary may also reduce loans another 10 percent regardless of the stocks-to-use ratio.

The Act provides for a nonrecourse marketing loan for oilseeds. The loan rate for soybeans is set at $5.02 with a 2 percent loan origination fee. The loan rates for sunflower seed, canola, flax, and safflower will be set at comparable rates. If soybean prices remain above the loan rate, the marketing loan feature will have no real benefits.

Acreage Reductions

The maximum acreage reduction (ARP) is 20 percent for wheat and feed grains. For 1991, an acreage reduction of 15 percent for wheat and no less than 7.5 percent for feed grains is expected. However, for their 1991 crop, wheat producers may choose between a 15 percent triple-base reduction or deficiency payments calculated over the full 12 months of the marketing year.

Haying and grazing on the ARP and 0/92 and 50/92 conserving use land is permitted, except for a five-month period designated by the state ASC committee. Unlimited haying and grazing may be permitted during a natural disaster.

Wheat and feed-grain producers also may sign up for the 0/92 program, plant a minor oilseed crop, such as canola or sunflowers, on their payment acres, and receive the projected deficiency payment. Under this special program, the producer retains his base history but is not eligible for marketing loans on any of the acreage planted to the minor oilseed.

Because there is no cross-compliance, you can participate in the feed grain program, for example, and plant more wheat than your base would allow.

Acreage Bases and Program Yields

As a general rule, the crop acreage base for each program crop for a farm shall be the average number of acres planted or considered planted to the program crop for harvest in each of the five preceding crop years.

However, the county committee may adjust any crop acreage base for any program crop on any farm if "the crop acreage base for the crop on the farm would otherwise be adversely affected by a condition or occurrence beyond the control of the producer."

Program payment yields will be the same as in 1990. The provisions on program yields for the 1991 through 1995 crops are basically the same provisions that applied from 1986 through 1990.

However, the Secretary of Agriculture may adjust program yields based on yields of the previous five years. The Secretary also has authority to allow producers to report actual yields to the local ASCS office should some adjustments be permitted in future years.

Deficiency Payments

Deficiency payments will be calculated as before: the difference between the target price and the higher of the loan rate or average market price for the designated months, multiplied by the program yield, multiplied by the acreage eligible for payment.

For acreage underplanted under 0/92 and 50/92 provisions, the deficiency payment will be paid at no less than the rate projected in advance, which will be announced before signup.

Advance payments will be 40 to 50 percent of the projected deficiency payment rates for wheat and feed grains.

Farmer-Owned Reserve

The farmer-owned reserve is authorized, but its availability will depend upon market prices and projected stocks-to-use ratios. The maximum must be between 300 and 450 million bushels for wheat and 600 to 900 million bushels for corn. Interest may be charged when the wheat or feed grains price exceeds 105 percent of the target price, and storage payments may stop when market prices exceed 95 percent of the target price.

Payment Limitations

The $50,000-per-person limit on direct and deficiency payments is maintained. A new $75,000 limit is placed on marketing loan gains, loan deficiency payments, and Findley payments (to make up the difference between administratively reduced loan rates and the statutory rates).

The maximum payment an individual can receive has been reduced from $500,000 to $250,000. The total does not include payments made under the Conservation Reserve Program, which has separate limitations. An individual could receive a maximum of another $125,000 from interest in two other farming entities. The prohibition on payments to foreign persons is extended through 1995.

The rule on spouses has been clarified. A husband and wife will be considered one person for payment purposes unless, prior to their marriage, they were separately engaged in unrelated farming operations and the operations remain separate.

Hybrid Seed Contracts

A farm owner or operator growing hybrid seed under contract can be considered actively engaged in farming without regard to the seed production contract.

Environmental and Conservation Programs

The sodbuster feature of the 1985 Act has been extended, denying program benefits for cropping land that has not been cropped for an extended time and expanding the list of program benefits lost for violations. Sanctions from $500 to $5,000 can be levied for inadvertent violations, but only one violation can be sanctioned in a five-year period.

The Swampbuster Program, which denies benefits for converting wetland to cropland, expands the list of lost benefits and includes graduated fines of $750 to $10,000 for inadvertent violations occurring once in the last ten years if the farmer agrees to restore the wetland. Swampbuster violations now occur when a wetland is converted for planting instead of when the crop is actually planted.

The Water Quality Incentive Program establishes a 10-million-acre five-year program to protect water quality. This program is voluntary, and it includes annual cash incentive payments with agreements to run for three to five years. Farm owners and operators with approved plans may receive incentive payments of up to $3,500 per person per year. Producers may also receive cost-share assistance of up to 50 percent of the cost of a practice with a maximum of $1,500 per person. Assistance is also available for improving wildlife habitat.

The Conservation Reserve Program (CRP), established in the 1985 Act, is part of a new umbrella program named the "Agricultural Resources Conservation Program" (ARC). The CRP is authorized to enroll from 40 million to 45 million acres by 1995. Under the 1985 Act, about 34 million acres were enrolled by the spring of 1990. In addition to highly erodible cropland, certain marginal pasture lands that have been converted to wetlands or designated for planting to trees and permanent sod-grass waterways may now be eligible.

The emphasis shifts from enrolling highly erodible land to protecting vulnerable water quality areas, wetlands, and wildlife habitat areas under a an Environmental Conservation Acreage Reserve Program (ECARP).

For the first time, a Wetlands Reserve Program allows farm owners to protect and restore their wetlands by enrolling them in a reserve program and selling the federal government a conservation easement. These easements may be permanent, for 30 years, or for the maximum amount of time allowed under state laws. Cropland acreage bases can be retained. The maximum payment for such easements, to be paid in annual installments or in a lump sum, is $50,000.

Dairy Program

The milk support price has been frozen at $10.10 per hundredweight. However, if government purchases exceed 7 billion pounds a year, dairy farmers would be assessed 5 cents per hundredweight. This amount would be taken out of milk checks in 1991, and 11 cents per hundredweight would be removed from 1992 through August 31, 1995. This assessment can be refunded to a producer who can prove that his or her milk production has not increased from the previous year.

Pesticide Record Keeping

Commercial applicators and private users of restricted pesticides must maintain records of restricted-use pesticides. Records should include the product name, the amount applied, and the approximate date and location of the application. These records are to be available to federal or state agencies that deal with pesticide use. In no case, however, can a government agency release data that would directly or indirectly reveal the identity of individual producers.

Facing New Cropping Decisions

The new flexibility options offered to farm owners and operators present many potentially confusing decisions in the next five years. On farms growing corn or wheat, lower returns are very likely as a result of lower government payments in 1991 and later years. Many farmers will want to offset the decreased direct government payments.

Because payments will be paid on only part of the corn or wheat base acreage, Illinois farmers must decide whether to plant corn, wheat, soybeans, hay, another oil seed crop, or some new experimental crop on the triple-base (no payment) acreage. With reduced payments, each farm operator may also want to assess whether participation will bring more returns than nonparticipation.

Our national agricultural and food policy seems to be shifting from agricultural commodity price and income support to natural resource management. The new conservation programs may offer special opportunities for Illinois farm owners and operators.

Prepared by:

Harold D. Guither
Extension Economist
Public Policy

Issued by:

Harold D. Guither

Harold D. Guither

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
at Urbana-Champaign
1301 W. Gregory Drive
Urbana, Illinois 61801

FIRST CLASS